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APPENDIX A

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HORNSBY AQUATIC CENTRE

POTENTIAL ACCESS ARRANGEMENT INDEPENDENT REVIEW

Project No. X12109

Prepared for Hornsby Shire Council

March 2012

COMMERCIAL IN CONFIDENCE

March 2012

HORNSBY AQUATIC CENTRE

INDEPENDENT POTENTIAL ACCESS ARRANGEMENT REVIEW

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1. EXECUTIVE SUMMARY

This report has been prepared to provide an independent assessment of potential access options to provide vehicular / pedestrian access to the Hornsby Aquatic Centre (HAC) as part of the redevelopment of the site.

The report has analysed the original seven (7) access options for the site prepared and investigated by Hornsby Shire Council as part of the development application process. Further, this report has assessed an additional two (2) options presented by the public at the recent meeting of the Joint Regional Planning Panel (JRPP). Options 9, 11 and 12 were developed by Hornsby Council as additional alternative access options after the JRPP meeting. Option 13 was submitted to the JRPP via email dated 16 March 2012 by Graham Hosking and is also assessed.

The assessment of each potential access option has considered the following key elements:

1. Ease of access
2. Sight Distance at Access Points
3. Impacts of Proposed Accesses on Surrounding Elements
4. Level of service
5. Internal Queuing
6. Internal Ramp Design
7. Road Safety & good traffic management

Overall, this analysis has determined that there are essentially three (3) options that could be considered to provide access to the new Hornsby Aquatic Centre. These include:

1. Option 1: Access off Coronation Street involving the demolition of the Women's Rest Centre
2. Option 8: The Cambourn one way anti-clockwise loop option, and
3. Option 2: Driveway access north of the Women's Rest Centre

The Cambourn one way loop option is feasible from a traffic perspective, but it has some limitations. These limitations include:

1. Elimination of the existing right turn movement into the TAFE car park at the northern end of Hornsby Park which would necessitate a circuitous route for TAFE vehicles travelling from the north
2. The loss of three (3) car parking spaces on the eastern side of the Pacific Highway to facilitate construction of right turn bay into Hornsby Park at its northern end
3. Lowering the floor level of the carpark and therefore the western end of the northern access road to facilitate entry to the car park by service vehicles (excluding garbage trucks).

Access arrangements which diminish access for an existing development, as would be the case for Option 8 is not considered an appropriate outcome. It should be noted that as the egress is at traffic signals, the RMS requires this to be designed as a roadway not a driveway. Therefore the Camboun option does not achieve any reduction in the 'look' of the southern access road nor the width of road required by the RMS. The northern access off the Pacific Highway would be constructed as driveway and would therefore have uncontrolled traffic and pedestrian movements.

Option 2 is limited to left in left out only and will reach capacity in 2021. Whilst Option 2 is not desirable because of poor access from the north, it does address a number of issues raised by the JRPP including the retention of the Women's Rest Centre, is a less engineered solution (driveway not a road and narrower) and does not require major works on the Pacific Highway. It is also respectful of existing plantings in that no heritage listed turpentine trees will be disturbed by this option. However, it should also be noted that approximately eight (8) of parking spaces on Pacific Highway will be lost and has other heritage impacts on the park.

All other options include elements which would not be compliant with relevant standards or would require diminished traffic arrangements with adjoining developments. Option 7 provides the poorest access arrangements of any option with access being via a convoluted route.

On balance Option 1 is considered the best option to provide vehicular access to the site. This includes the provision of a two way roadway at the southern end of the site and signalised access to the Pacific Highway. The reasons for this choice include but are not limited to:

1. Rationalisation of access arrangements in Pacific Highway;
2. Future performance of access intersection;
3. Lower potential queues for exiting traffic within the site;
4. Australian standard compliant ramp grades to provide general and service vehicle access;
5. No issues with sight distance for exiting traffic; and
6. No impact to on-street parking to provide the facility.
7. This is considered the safest option as all traffic movements are controlled by traffic signals.

The final rankings of each of the thirteen assessed options are summarised below.

Table 1 – Overall Rating of Each Potential Access Option

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13
Ease of Access	✓✓✓	✓✓	✓✓	✓✓✓	✓	✓	✗	✓✓	✓✓	✓✓	✓✓	✓✓(2)	✓✓
Sight Distance	✓	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗	✓	✗
Impact on Parking/access to adjoining developments	✓✓✓	✓	✗	✓	✗	✗	✗	✗	✓	✗	✗	✓✓	✗
Level of Service	✓✓	✓	✓✓(1)	✓✓				✓✓(1)	✗	✓✓(1)	✓✓(1)	✓✓	✓✓(1)
Ramping	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓	✓	✓
Ramp & Queue Space	✓	✓	✗	✗	✓	✓	✓	✓	✗	✗	✗	✓	✗
Road Safety & Good Traffic Management	✓✓✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓✓(2)	✓
COMMENTS	Overall best option	Limited to LEFT IN LEFT OUT	Requires TAFE Right Turn Blocked	Limited to LEFT OUT only	Unacceptable impact on Dural Street Footway	Unacceptable impact on Dural Street Footway	Poor Access alignment	Requires TAFE Right Turn Blocked	Limited to LEFT IN LEFT OUT	Requires TAFE Right Turn Blocked	Requires TAFE Right Turn Blocked	Poor right turn alignment not supported by RMS	Requires TAFE Right Turn Blocked

(1) Requires right turn TAFE entry is blocked off by traffic median
(2) Right turn alignment not supported by RMS

2. BACKGROUND

2.1 The Proposal

Hornsby Shire Council has prepared a development application for the redevelopment of the now defunct Hornsby Aquatic Centre. The redevelopment of the site includes construction of the following main items:

- Maintain outdoor 50m pool
- Indoor pools including a learn to swim pool and leisure pool
- Administration area
- Kiosk
- Multi-purpose rooms for pool operations and / or community use.
- 111 space carpark under pools

The proposal includes a 3.5m height clearance to the car park at the southern end and 2.9m height clearance at the northern end of the car park. The difference in clearance is due to the deep end of the 50m pool being at the northern end.

Thus all service vehicles would enter the site at the southern end and those vehicles which can operate within a height clearance of 3.5m (service vehicles, small rigid trucks, soft drink deliveries) would be able to enter and exit the basement car park. The waste services would also be undertaken by a standard garbage truck at the southern end with the waste vehicle parked just prior to the basement entry and bins brought to the vehicle. The waste vehicle would then exit the site in a forward direction.

The nature of these types of developments is that they are not developments where 'passing traffic' wish to gain access such as a local store. Patrons can travel some distances to the development and often their sole purpose of the trip is to travel to and from the development itself. In some cases persons may frequent the site on their way to or from work. However, the majority are site specific trips.

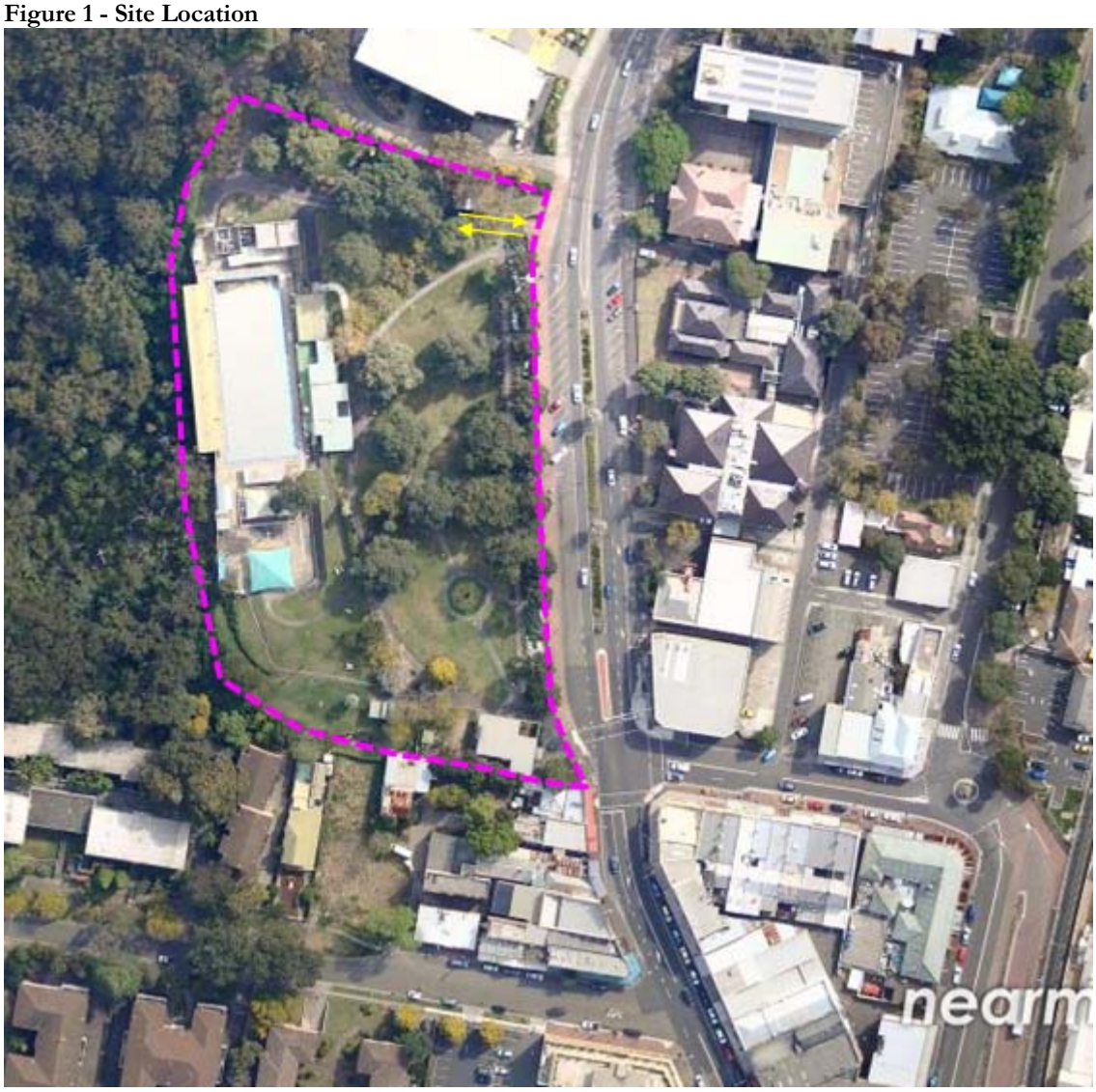
The operation hours of the development often extend well before and well after typical road network peak periods where access is undertaken during low light or night hours. Thus, access arrangements need to be of a suitable standard to accommodate the above characteristics of use.

2.2 Existing Access Arrangements

The site includes a driveway from Pacific Highway at the northern end of the site which services a small open air car park. A wide pedestrian pathway is provided at the southern end of the site across the frontage of the Women's Rest Centre building providing a direct link to the traffic signals. This pathway was used informally by the CWA, the recent tenant of the Women's Rest Centre building, and park service vehicles.

The location of the development and the existing access driveways are shown in Figure 1 below.

Figure 1 - Site Location



© Nearmap

2.3 Access Options

As part of the development of this DA, Council investigated seven (7) potential access arrangement options to provide vehicular access to the site. Vehicular access would include general vehicles and service vehicles up to an expected largest size of a heavy rigid truck. A heavy rigid truck would be expected to provide waste services at the site and smaller trucks would deliver goods such as servicing elements of the kiosk and pool plant. Copies of the seven (7) potential access options are provided in Figures 2 to 8 of this report.

It should be noted that not all options were assessed for their future intersection performance. The assessment was limited to a general review of potential arrangements and resultant internal ramp arrangements.

For Options 1 and 2 & 5 to 7 a heavy rigid vehicle (HRV) garbage truck would have sufficient turning areas and would not be required to access the area under the pool.

Option 1, the option to provide a fourth leg to the signalised intersection of Pacific Highway / Coronation Street, was formally assessed using an intersection analysis program after it was determined that this was the preferred option to provide access to the site. The consultation included discussions with Roads and Maritime Services (RMS) whom agreed a fourth leg to the signalised intersection offered the preferred solution to provide access to the site.

It is noted that the preferred access option involves the removal of the existing Women's Rest Centre building in the south – east corner of the site. It was also noted that the time of writing this report that the building was no longer used by the CWA and new meeting facilities would be provided as part of the redevelopment of the Hornsby Aquatic Centre.

2.4 Previous Traffic Reports

The redevelopment of the subject site has been assessed by a number of previous traffic reports. In particular, the September 2011 report prepared by McLaren Traffic Engineering and the August 2011 microsimulation study on the preferred access arrangement (Option 1) prepared by Cardno. Copies of these reports are provided in **Appendix A** of this report.

The McLaren traffic report[1] provided a first principles assessment of potential traffic generated estimated by assessing swim class sizes, staff demands etc. This report adopted a 58% north / 42% south trip distribution of trips generated by the proposal. This split was determined by survey of patrons prior to the closure of the HAC. The report found that the proposed access intersection would operate at a satisfactory level of service (Level of Service C) in the year 2011 (current conditions) and 2021. 2021 forecasts were estimated by McLaren based on the 2014 Cardno forecasts which are described further below.

The Cardno report[2] included microsimulation modelling (PARAMICS) and SIDRA intersection analysis of the proposed signalised access arrangement. The Paramics model developed for the area was used to provide 2014 and 2021 forecasts including the redevelopment of the Hornsby Aquatic Centre and other major sites in the nearby area.

The Cardno assessment found that the proposed access arrangements would operate at a satisfactory level of service (Level of Service B) in both the AM and PM peak periods in 2014.

It is noted from the McLaren report that the level of service assessment included a slight error. Page 8 of the report included tables of average delay for 2011 and 2021 AM and PM peak periods ranging from 22.4 seconds to 27.7 seconds. However, a level of service C was reported for each case whereas an average delay of 15-28 sections equates to a Level of Service B. Thus this explains the variation between the reported future levels of service of both reports.

[1] Proposed redevelopment of Hornsby Aquatic Centre Pacific Highway, Hornsby Traffic and Parking Assessment – McLaren Traffic Engineering September 2011
[2] Hornsby Aquatic Centre Intersection Assessment – Cardno August 2011

2.5 Joint Regional Planning Panel Assessment

The development application was considered by the independent Joint Regional Planning Panel at their meeting held on Thursday 23 February 2012. During the course of the meeting, a number of alternative access arrangements were presented by members of the public to endeavour to provide satisfactory access to the site whilst retaining the Women's Rest Centre building.

These additional options, known as Options 8 and 10 of this report are further described in Section 3 of this report.

After reviewing the proposal and submissions from interested parties, the panel made the following recommendation as detailed in the minutes from the meeting:

"The Panel has decided that it agrees with only two aspects of the application before it tonight, namely –
1 – The demolition of the existing aquatic centre, and
2 – The erection of the proposed new aquatic centre of three levels and basement parking.

However, the Panel requires the applicant to give further consideration to the access across the heritage listed Hornsby Park and would prefer a roadway that is more sensitive to the heritage significance of the Park and will retain the CWA Building. The Panel recommends a less engineered solution for this roadway, not involving major works on the Pacific Highway, and considers the road should be designed to have less heritage impact, not to be designed for heavy vehicles' but for the most likely users – namely domestic cars, and to be more respectful to existing plantings. The panel accepts the need for the removal of the Pine tree and agrees with the manner in which the applicant intends to deal with a replacement tree."

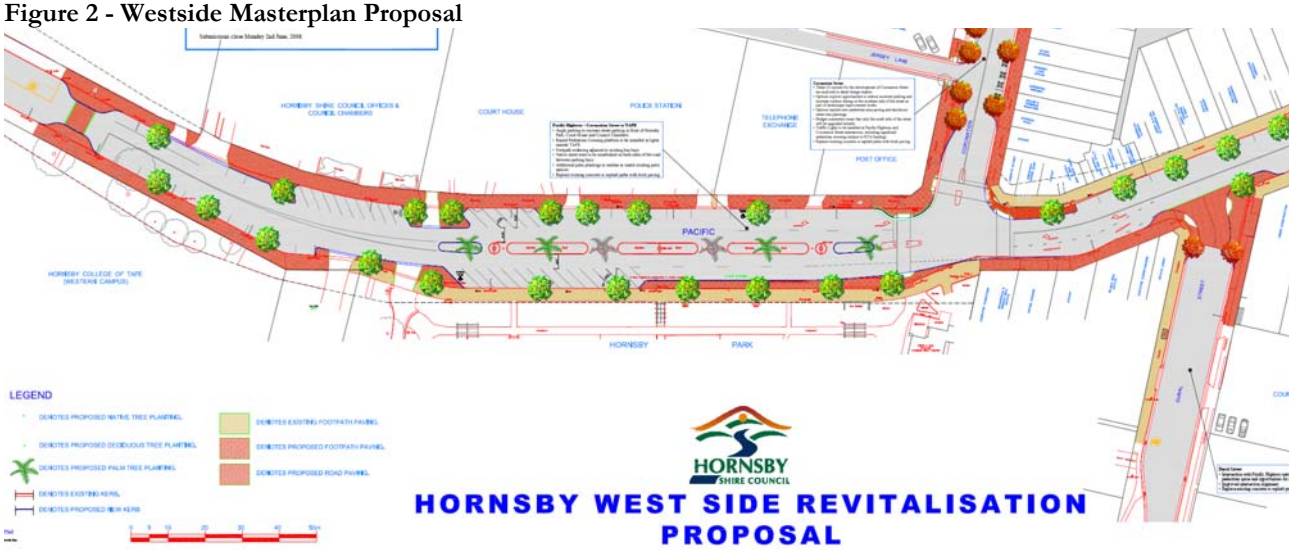
2.6 Hornsby Westside Masterplan

Of consideration to the potential access arrangements of the HAC is the approved Hornsby Westside Masterplan which includes streetscape works on the Pacific Highway past the frontage of the site. The scheme was approved by Hornsby Council on 13 August 2008.

Amongst other improvements, across the frontage of the site the approved masterplan includes landscaping, additional angled parking and parking lane edgelines to improve sight distance and create a one lane environment in either direction in the Pacific Highway.

The section across the frontage of the site is shown in **Figure 2**.

Figure 2 - Westside Masterplan Proposal

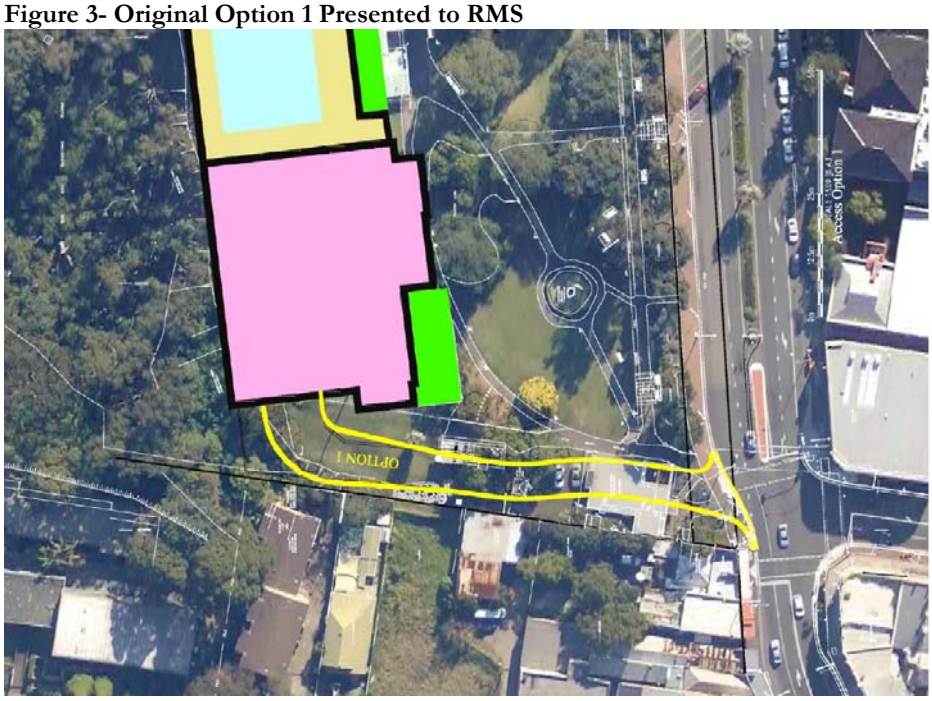


The proposal includes a narrowing of the available pavement width at the existing northern driveway of the HAC to provide angled parking on the eastern side of the Pacific Highway opposite the TAFE driveway. The angle parking was provided several years ago.

2.7 Initial Consultation with Roads and Maritime Services (RMS)

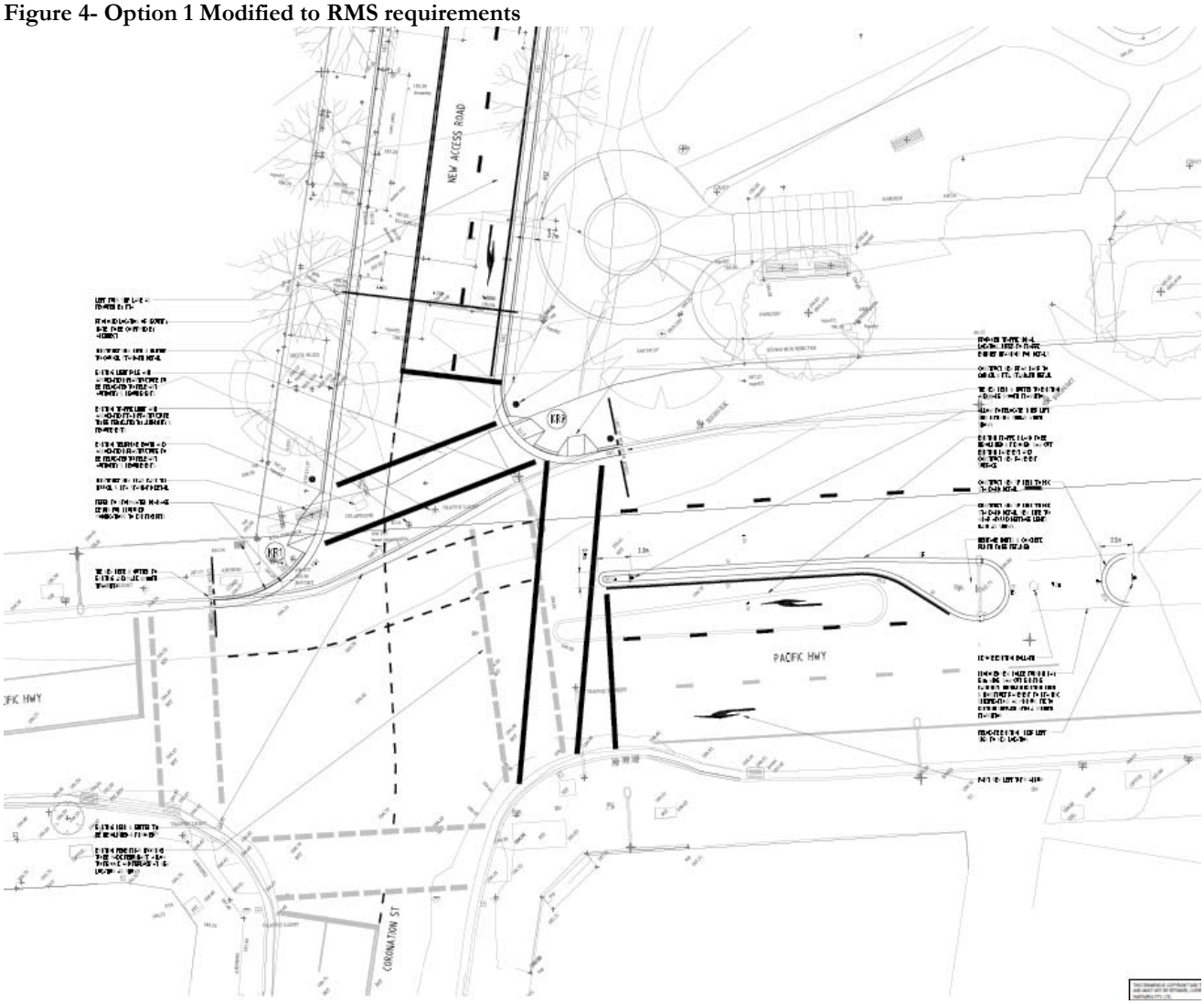
As all traffic signals are under the care and control of RMS, it is understood that Option 1 was presented to RMS representatives for preliminary consideration and feedback. The option presented to RMS for review included a single exit lane and single entry lane from the HAC. It also included a short right turn bay from Pacific Highway for southbound traffic. The configuration presented to RMS is shown below.

Figure 3- Original Option 1 Presented to RMS



It is understood that the advice from RMS was the HAC could be serviced from the traffic signals at the intersection of Pacific Highway / Coronation Street, however, the access road must be widened to provide two exit lanes for a distance of some 25m into the site. This would allow the creation of a left turn lane and through / right turn lane. The configuration instructed by RMS is provided below.

Figure 4- Option 1 Modified to RMS requirements



3. APPLICABLE STANDARDS

The following standards are considered relevant to determining the most appropriate access arrangement for this development.

These are the standards that Council typically applies to all new development.

3.1 Australian Standard for Off Street Parking Facilities – AS2890.1

This standard includes guidelines on all matters pertaining to access arrangements, car park access design, car park design and parking operations for all developments.

The standard includes items such as recommended aisle widths, parking space dimensions, access sizing dependent on size of car park served and frontage road, manoeuvring areas, sight distance, etc.

3.2 Australian Standard for Commercial Parking Facilities – AS2890.2

AS2890.2 provides guidelines for all items relating the design of access arrangements, parking and manoeuvring areas for service vehicles ranging from small rigid trucks to B-doubles.

The standard provides guidelines on sizing of access driveways / roadways, appropriate ramp grades, height clearances and sight distance amongst other related items.

3.3 RTA Guide to Traffic Generating Developments

This guide provides recommended traffic generation and parking generation rates for a range of developments. As the traffic generation of parking needs of the development has been estimated from first principles (as suggested by the guide where a development is not listed), these components of the guide will not be referred to in this assessment.

However, as noted in the review of the background traffic reports the Level of Service Criteria has been used in this assessment. This is provided below.

For reference, the RTA Level of Service Criteria from the RTA Guide to Traffic Generating Developments is provided in Table 2 below.

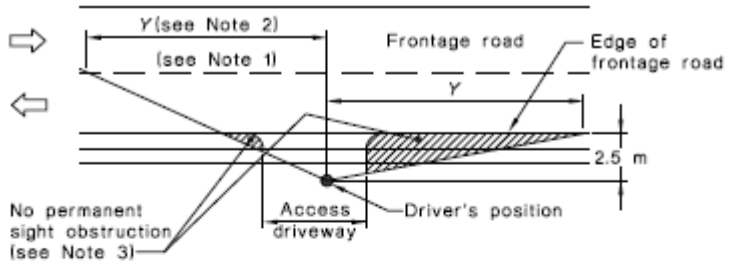
Table 2 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

3.4 Access Site Distance Requirements

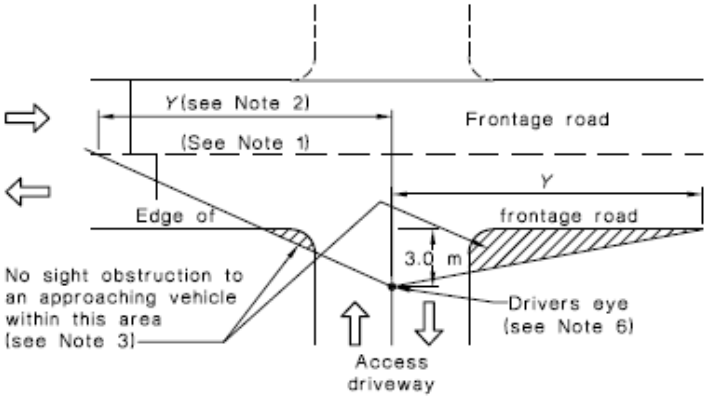
The Australian Standard for Off Street Parking Facilities - AS2890.1 and the Australian Standard for Commercial Parking Facilities – AS2890.2 both provide sight distance requirements to approaching traffic for exiting light and heavy vehicles respectively. The relevant requirements from each standard are provided below:

Figure 5 - AS2890.1 Sight Distance Requirements



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

Figure 6 - AS2890.2 Sight Distance Requirements



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road (Note 5) m	
	5 s gap	8 s gap
40	55	89
50	69	111
60	83	133
70	97	156
80	111	178
90	125	200
100	139	222
110	153	244

From **Figure 5** and **6** it is noted that for light vehicles a minimum of 45m with a desirable 69m is required for light vehicles and a minimum 69m for commercial vehicles assuming a 50km/hr frontage speed limit. Upon realisation of the approved masterplan and introduction of a 40km/hr High Pedestrian Activity area, it would reduce to some 55m minimum for commercial vehicles and 35m for light vehicles.

It should be noted that the above requirements apply to priority controlled access arrangements and not signalised arrangements.

3. POTENTIAL ACCESS OPTIONS

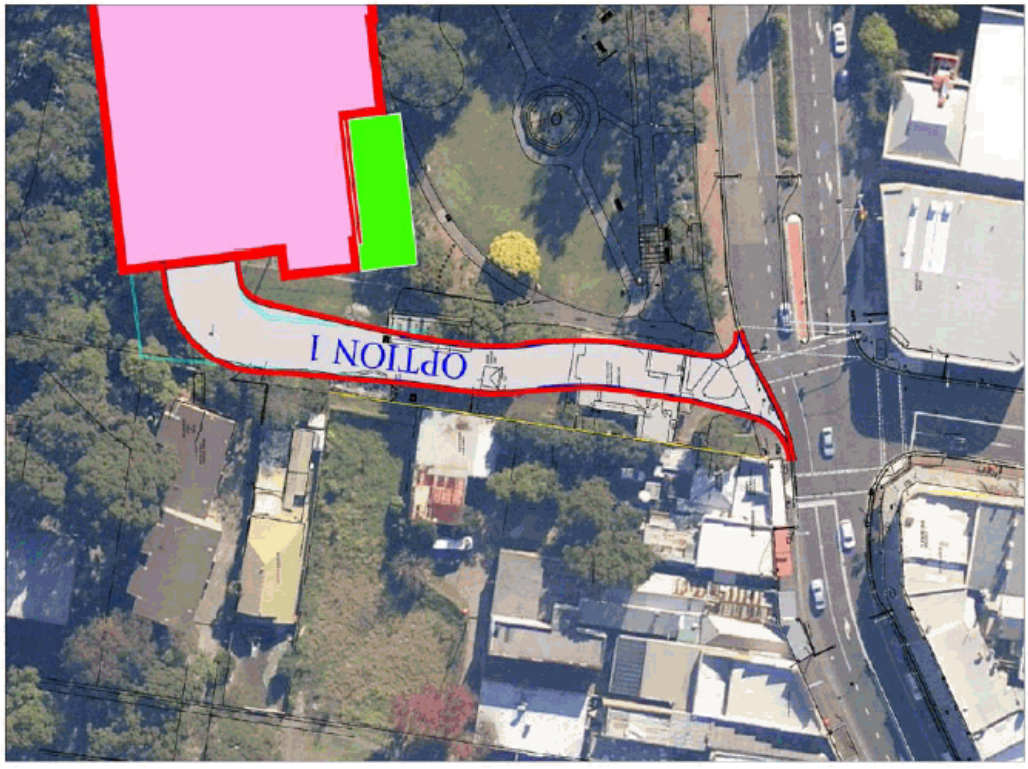
In summary, the following options have been reviewed:

Option 1 - Access into Hornsby Park opposite Coronation Street via traffic lights
Option 2 - Access north of Women's Rest Centre building.
Option 3 - Access northern end of Hornsby Park – widen existing access
Option 4 - Access through TAFE carpark
Option 5 - Access via No 4 Dural Street, privately owned land.
Option 6 - Access via No 6 Dural Street, the Montessori preschool site (Norwood).
Option 7 - Access via Old Man's Valley fire trail
Option 8 - Access via Loop road as proposed by Mark Cambourn
Option 9 - Access via Loop road as proposed by Mark Cambourn with ingress & egress reversed
Option 10 - Access through playground northern side of Hornsby Park
Option 11 - Access through playground northern side of Hornsby Park with access ramp at rear of pool to basement.
Option 12 – Left turn slip lane adopted as part of Option 1 (moved north)
Option 13 – 50 space open air car park as northern end of site

3.1 Option 1 - Access into Hornsby Park opposite Coronation Street

This option is shown in Figure 7.

Figure 7 - Option 1 Access into Hornsby Park opposite Coronation Street



The key elements of this option are summarised below:

- Access via the existing traffic signals at the intersection of Pacific Highway / Coronation Street

- Full turning movements at the access
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles including standard garbage truck
- Removal of the Women's Rest Centre building

3.2 Option 2 - Access north of Women's Rest Centre building.

This option is shown in Figure 8

Figure 8 - Option 2 Access north of Women's Rest Centre building

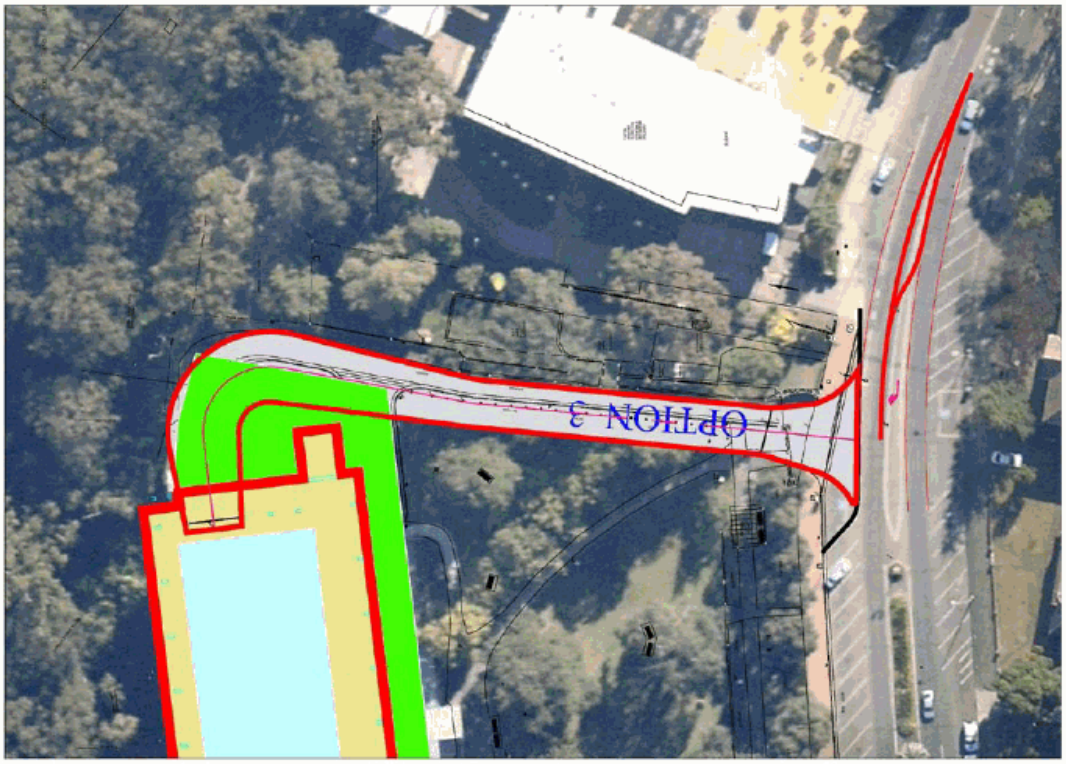
The key elements of this option are summarised below:

- Access via a left in / left out driveway immediately north of the existing traffic signals at the intersection of Pacific Highway / Coronation Street
- Inbound traffic from the north and outbound traffic to the south are required to use the surrounding road network to enter / leave the site
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles including standard garbage truck
- Retain Women's Rest Centre building

3.3 Option 3 - Access northern end of Hornsby Park – widen existing access

This option is shown in Figure 9

Figure 9 - Option 3 - Access northern end of Hornsby Park – widen existing access



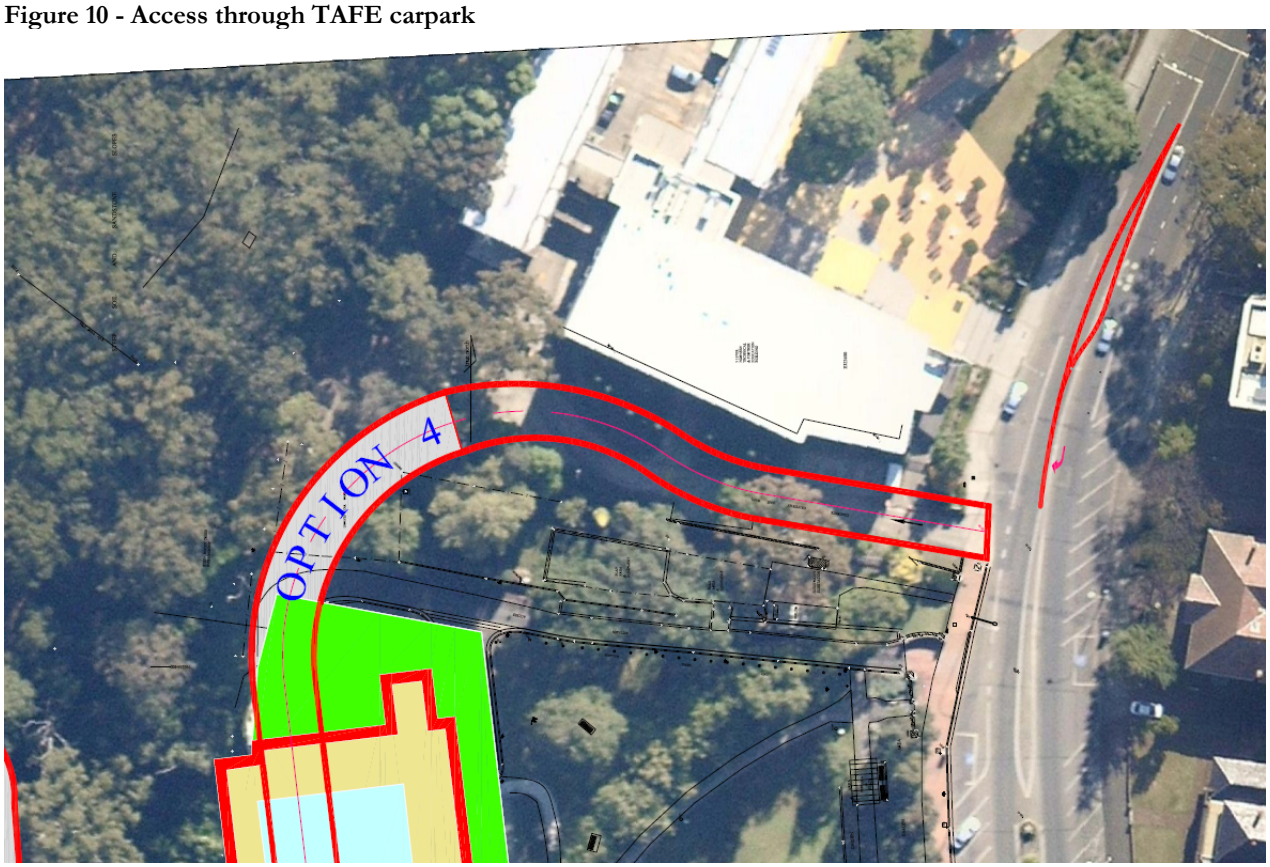
The key elements of this option are summarised below:

- Access driveway in the current location of the existing driveway
- Allows right turn movements inbound via separate turn bay (on basis right movements into TAFE are prevented through a physical island as part of the turn bay)
- Allows left turn in and left turn out turning movements
- Outbound traffic to the south are required to use the surrounding road network to leave the site
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building
- Would require specialised garbage truck which can operate in a 2.9m height clearance or lower

3.4 Option 4 - Access through TAFE carpark

This option is shown in **Figure 10**.

Figure 10 - Access through TAFE carpark



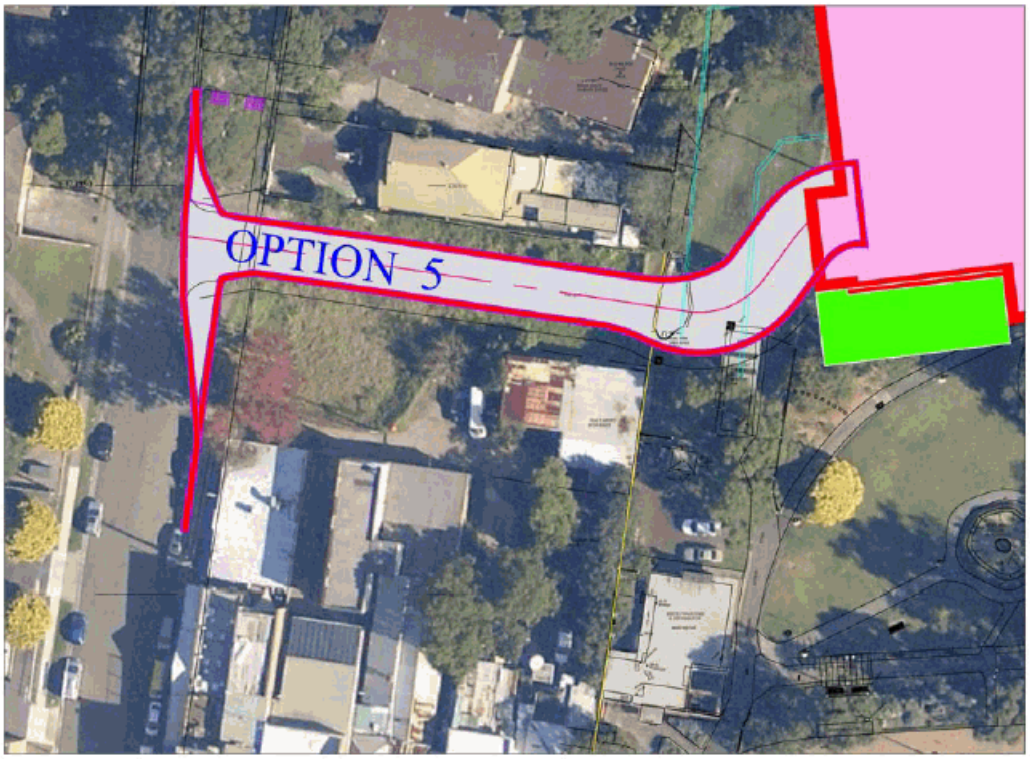
The key elements of this option are summarised below:

- Access via private property driveway adjacent to northern boundary of the site will require a right of way through TAFE and is considered poor planning practice
- Allows right turn movements inbound via separate turn bay (on basis right movements into TAFE are prevented through a physical island as part of the turn bay)
- Allows left turn in and left turn out turning movements
- Outbound traffic to the south are required to use the surrounding road network to enter / leave the site
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building
- Existing TAFE driveway is one-way (ingress)
- Would require specialised garbage truck which can operate in a 2.9m height clearance or lower

3.5 Option 5 - Access via No 4 Dural Street, privately owned land

This option is shown in **Figure 11**.

Figure 11 - Option 5 - Access via No 4 Dural Street, privately owned land



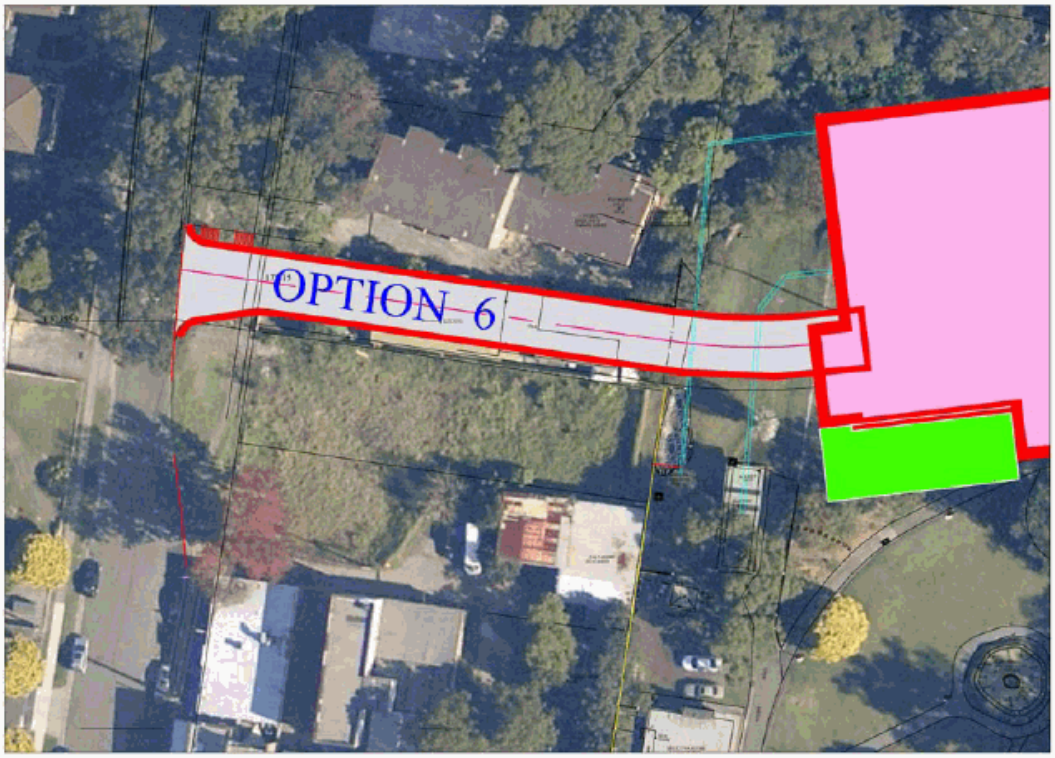
The key elements of this option are summarised below:

- Requires purchase of private land
- Full vehicle movements at access driveway in Dural Street
- Generated traffic subject to existing AM and PM peak hour turning restrictions at Pacific Highway / Dural Street
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building

3.6 Option 6 - Access via No 6 Dural Street, the Montessori preschool site (Norwood)

This option is shown in **Figure 12**.

Figure 12 - Option 6 - Access via No 6 Dural Street, the Montessori preschool site (Norwood)



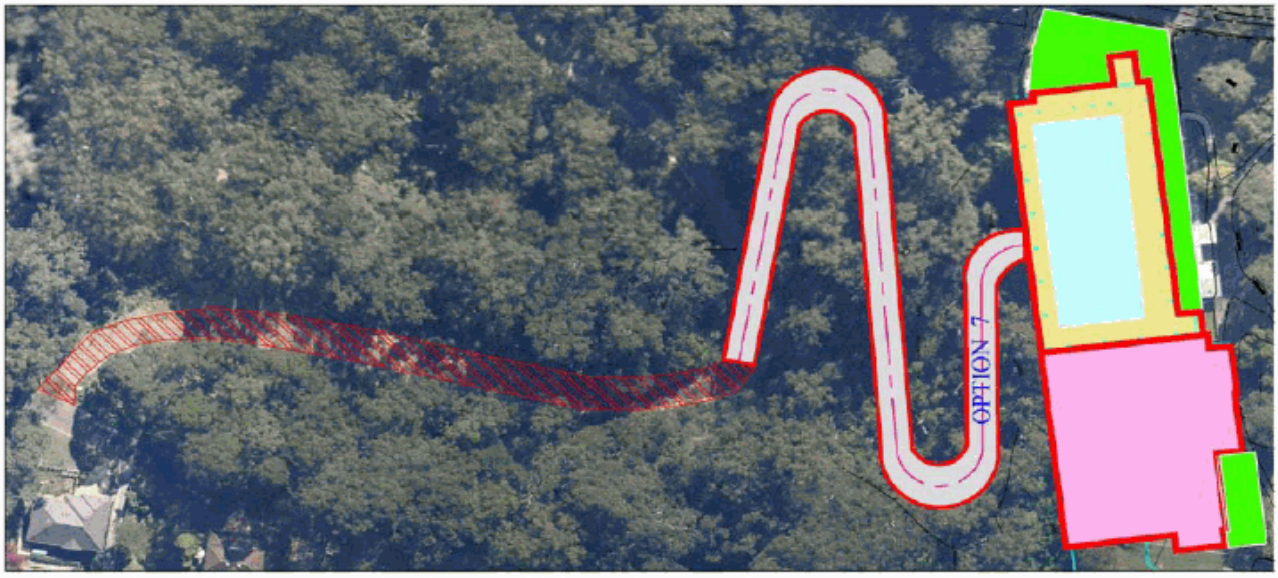
The key elements of this option are summarised below:

- Requires removal of heritage listed building under Council ownership
- Full vehicle movements at access driveway in Dural Street
- Generated traffic subject to existing AM and PM peak hour turning restrictions at Pacific Highway / Dural Street
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building

3.7 Option 7 - Access via Old Man's Valley fire trail

This option is shown in **Figure 13**.

Figure 13 - Option 7 - Access via Old Man's Valley fire trail



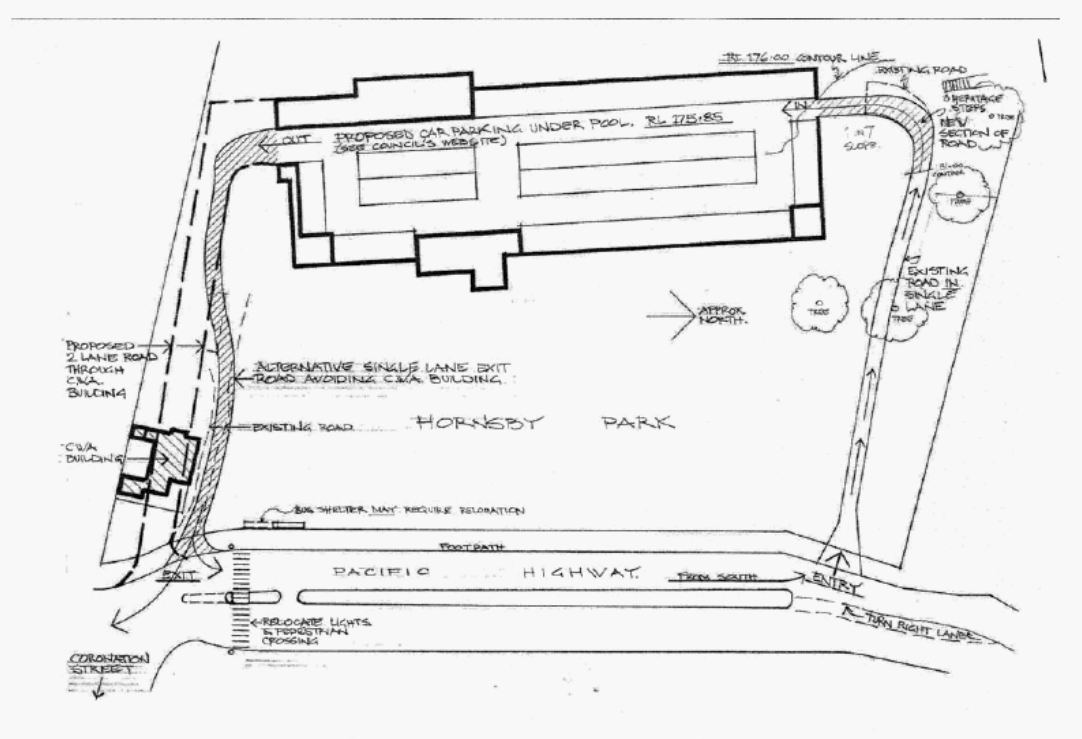
The key elements of this option are summarised below:

- Full vehicle movements at Quarry Road / Dural Street intersection
- Generated traffic subject to existing AM and PM peak hour turning restrictions at Pacific Highway / Dural Street
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building

3.8 Option 8 - Access via Loop road as proposed by Mark Cambourn

This option is shown in **Figure 14**.

Figure 14 - Option 8 - Access via Loop road as proposed by Mark Cambourn



The key elements of this option are summarised below:

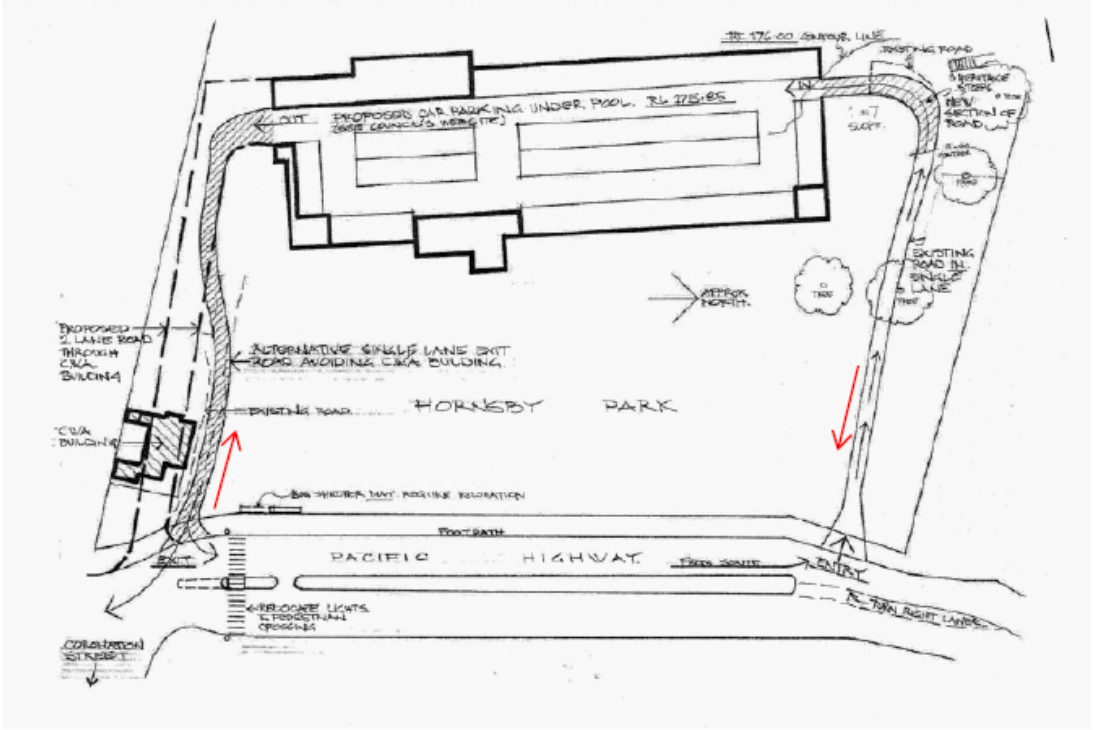
- One – way anti-clockwise internal road
- Allows right turn movements inbound via separate turn bay (on basis right movements into TAFE are prevented through a physical island as part of the turn bay)
- Left turn in at the northern end of the site at the location of the existing driveway
- Left out / right out access at southern end of the site via existing traffic signals at intersection of Pacific Highway / Coronation Street
- Internal roadway to accommodate both general vehicles and service vehicles
- Retain Women's Rest Centre building
- Would require specialised garbage truck which can operate in a 2.9m height clearance or lower

It should be noted that having regard to the panel's comments that the internal roadway should be in a form of a low order driveway to minimise visual impact on the park, the entry / exit roadways. However, it would require kerbing at the Pacific Highway and present as a roadway to comply with RMS requirements for access to the traffic signals

3.9 Option 9 - Access via Loop road as proposed by Mark Cambourn with ingress & egress reversed

This option is shown in **Figure 15**.

Figure 15 - Option 9 - Access via Loop road as proposed by Mark Cambourn with ingress & egress reversed



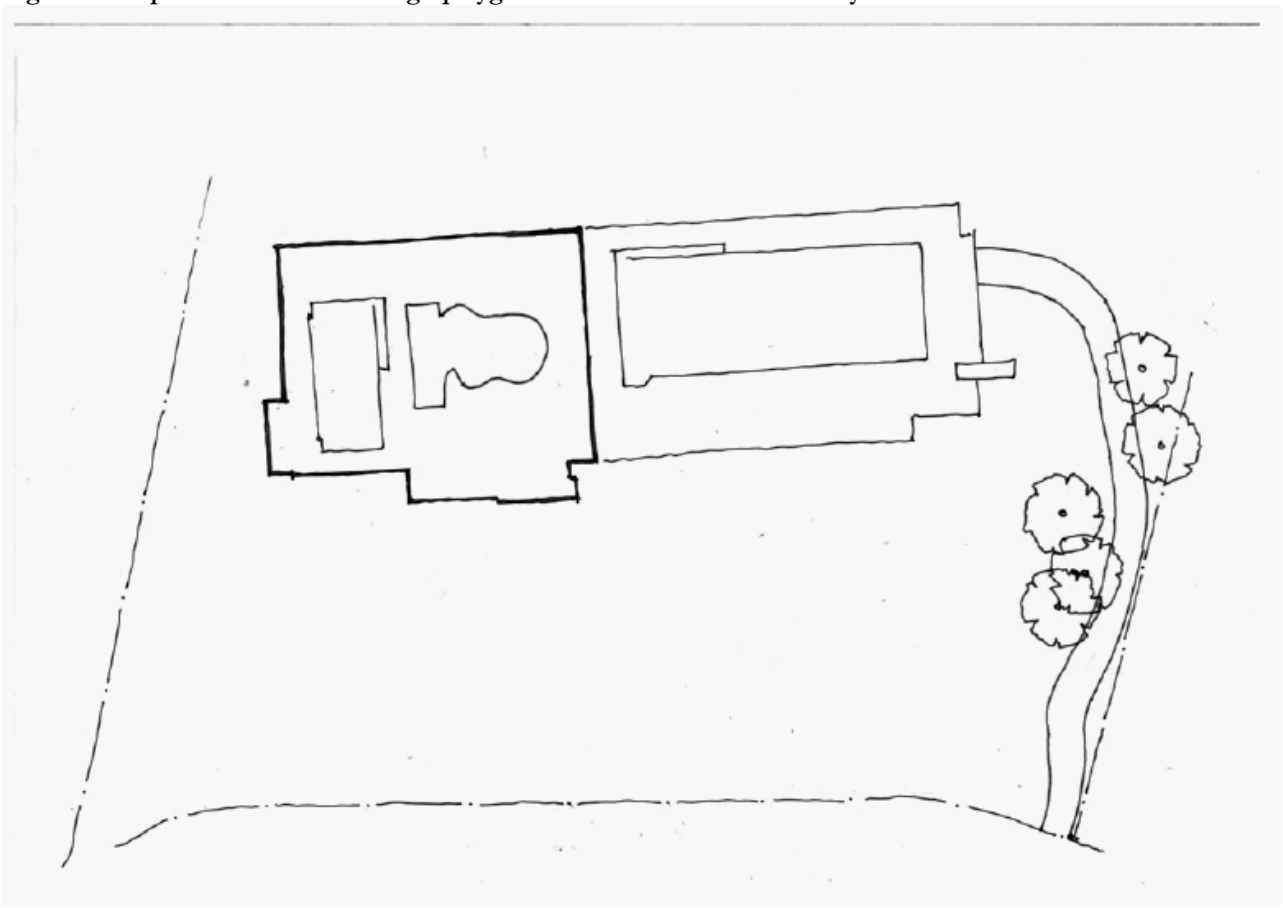
The key elements of this option are summarised below:

- One – way clockwise internal road
- Left turn out via one-way driveway at the northern end of the site at the location of the existing driveway
- Left in / right in access at southern end of the site via existing traffic signals at intersection of Pacific Highway / Coronation Street
- Internal roadway to accommodate both general vehicles and service vehicles
- Retain Women's Rest Centre building
- Would require specialised garbage truck which can operate in a 2.9m height clearance or lower

3.10 Option 10 - Access through playground northern side of Hornsby Park

This option is shown in **Figure 16**.

Figure 16 - Option 10 - Access through playground northern side of Hornsby Park



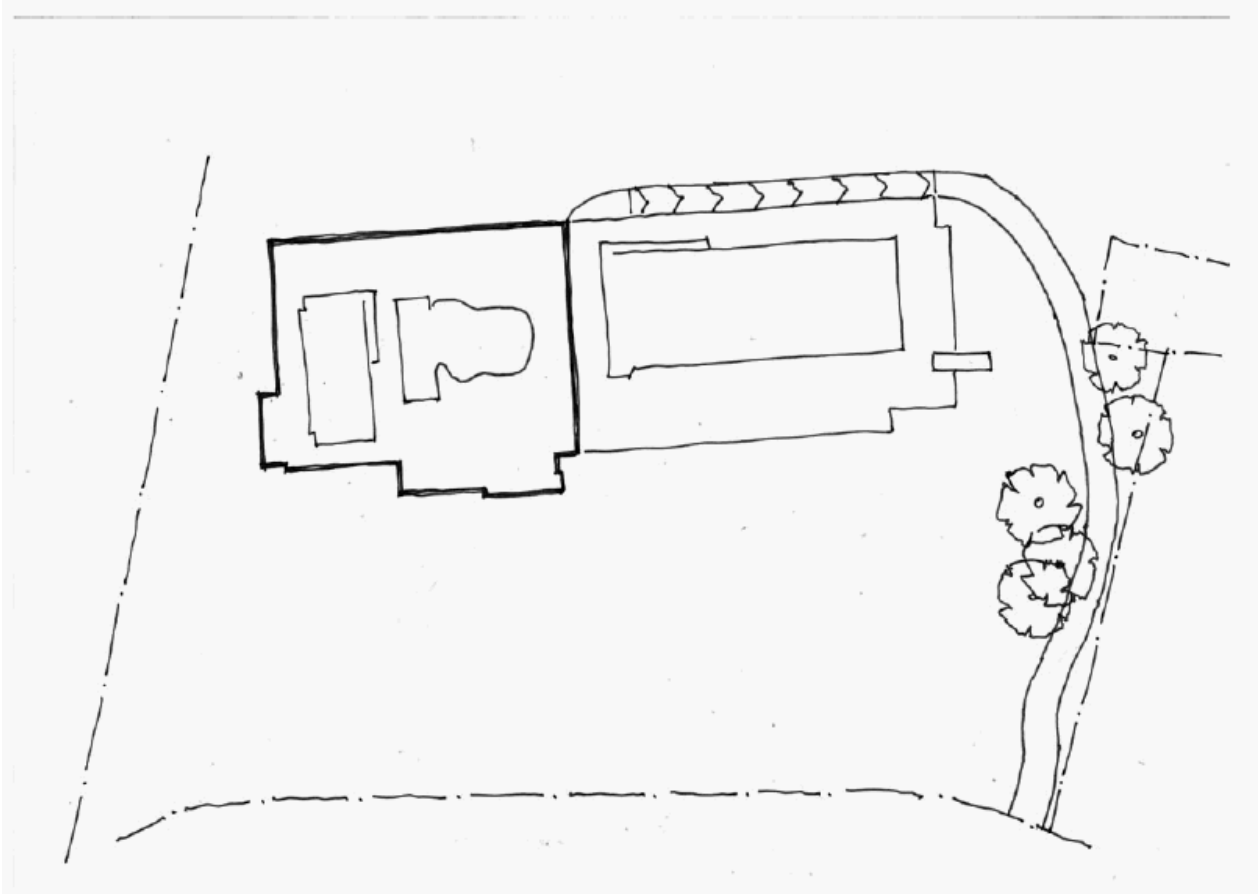
This option includes the same arrangements as Option 3. However, the internal roadway is moved closer to the northern boundary of the site to allow at grade connection between the existing park and the children's play centre near the northern boundary. The key elements of this option are summarised below:

- Access driveway in the current location of the existing playground and barbeque facilities
- Allows right turn movements inbound via separate turn bay (on basis right movements into TAFE are prevented through a physical island as part of the turn bay)
- Allows left turn in and left turn out turning movements
- Outbound traffic to the south are required to use the surrounding road network to leave the site
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building
- Would require specialised garbage truck which can operate in a 2.9m height clearance or lower

3.11 Option 11 - Access through playground northern side of Hornsby Park with access ramp at rear of pool to basement.

This option is shown in Figure 17

Figure 17 - Option 11 - Access through playground northern side of Hornsby Park with access ramp at rear of pool to basement.



This option again includes the same arrangements as Option 3. However, the internal roadway is moved closer to the northern boundary of the site to allow at grade connection between the existing park and the children's play centre near the northern boundary. Further, an elevated roadway is required around the rear of the building to provide access to the central area of the basement car park. The key elements of this option are summarised below:

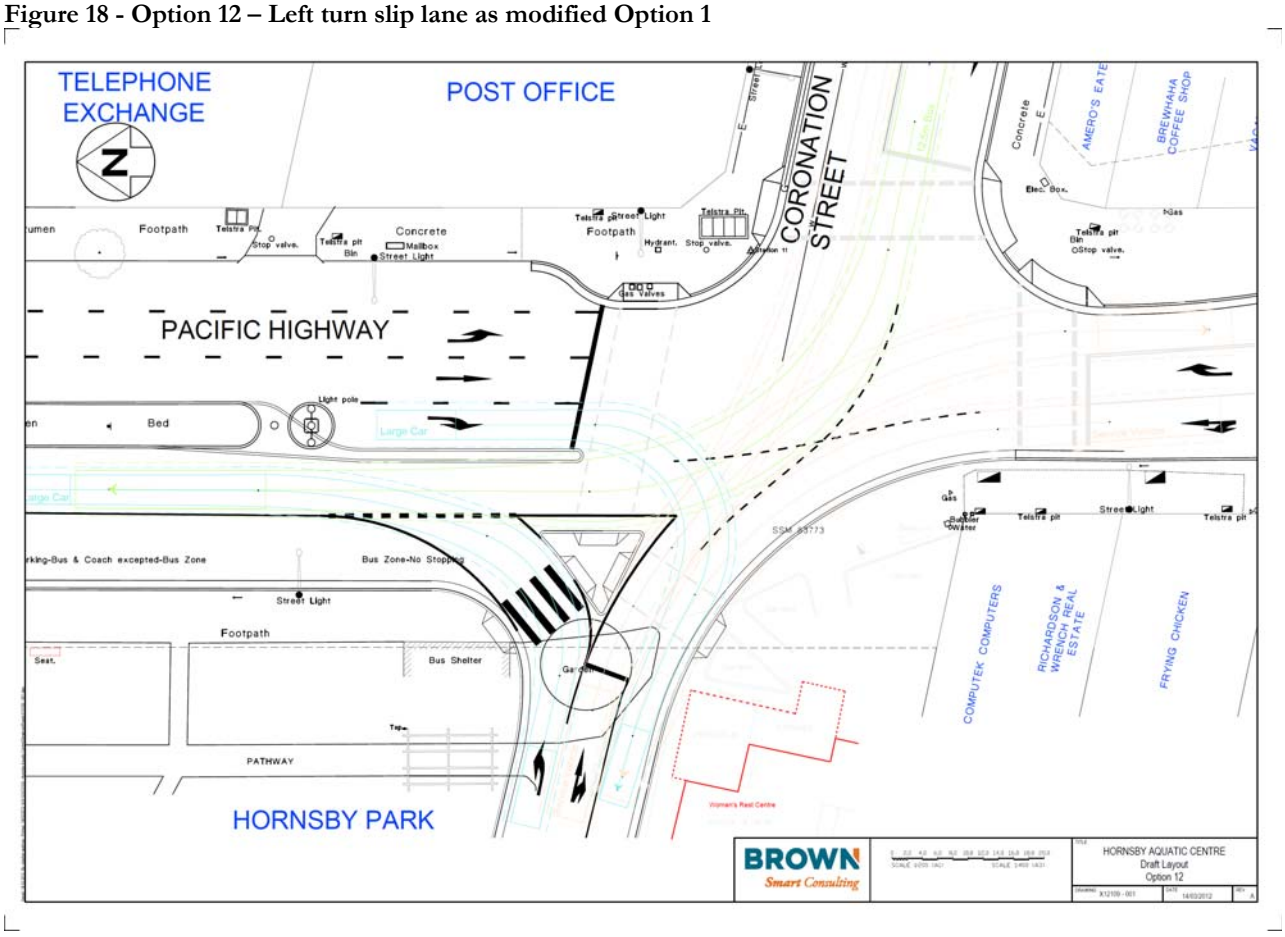
- Access driveway in the current location of the existing playground and barbeque facilities
- Allows right turn movements inbound via separate turn bay (on basis right movements into TAFE are prevented through a physical island as part of the turn bay)
- left turn in and left turn out turning movements
- Outbound traffic to the south are required to use the surrounding road network to leave the site
- Two – way roadway linking the Pacific Highway to the basement car park
- Access for general vehicles and service vehicles
- Retain Women's Rest Centre building

- Potentially would require specialised garbage truck which can operate in a 2.9m height clearance or lower

3.12 Option 12 – Left turn slip lane adopted as part of Option 1 (moved north)

During the course of preparing this report a further option was provided by Hornsby Council for consideration. The arrangement includes a signalised access at the Pacific Highway / Coronation Street traffic signals, a roadway which does not require the removal of the Women's Rest Centre building and a left turn slip lane for exiting traffic. The proposal is shown in **Figure 18**.

Figure 18 - Option 12 – Left turn slip lane as modified Option 1



- Traffic signal controlled right turn movements into and out of the site from Pacific Highway.
- Left turn slip lane separate to traffic signal control.
- Requires relocation of bus zone.
- Demolition of bus shelter

3.13 Option 13 – Access from Northern End of site – Graham Hosking Option

This option was submitted to the panel via email dated 16 March 2012 and is shown in **Figure 19**.

Figure 19 - Option 13 – Graham Hosking Option

The option provides a new play centre / toilet facility at the southern end of the site. Access arrangements would be the same as Option 3 and it is expected that right turn movements would be catered for as part of a right turn bay installation (on a basis right turn movements into TAFE are prevented through a physical island as part of a turn bay).

It is unclear as to the purpose of the note stating "50+ cars at this end" and whether it is assuming that a 50 car space open air car park would be provided either in place of or in addition to the 111 space basement car park of the pool.

It is also unclear how the 50+ space car park would be provided given the grades of the site and the ramping requirements. It appears the intent of the scheme is to provide no vehicle access at the southern end of the site.

4. ACCESS OPTION ASSESSMENT

4.1 Ease of Access / VKT

As stated above, the proposal is a regional attractor of trips. That is, whilst there are other swim centres in the surrounding areas, these types of developments draw patrons from reasonably long distances and are not developments which capture 'passing trips'. Thus, access to the site should be relatively straightforward and well delineated.

The ease of access assessment is related to the routes of travel to and from the site. It is noted from previous traffic reports that trip distribution is expected to be relatively evenly split between the north and south areas of the site.

Each option has been reviewed in regards to the length of trip for inbound / outbound travelling from the areas to the north and south of the site. That is, the shortest length of trip has been given a higher ranking compared with trips which require longer distances due to the need to re-route in either the inbound or outbound journey. This in turn increases the Vehicle Kilometres Travelling (VKT) and has a greater environmental impact.

It is noted that current AM and PM peak hour restrictions at the intersection of Pacific Highway / Dural Street would require re-routing during some five hours of a typical day and during times when patronage is expected to the reasonably high.

For options where inbound or outbound access is simple, a rating of '✓✓✓' has been applied. The longer and more convoluted the route, a rating of '✓ ✓' and '✓' has been applied with '✓' being the highest difficulty of access. In the event that the access arrangements are considered a poor outcome for the site, a rating of '✖' has been applied.

The ease of access assessment is provided in Table 3.

Table 3- Ease of Access Assessment

Option	Inbound from North	Outbound to North	Inbound from South	Outbound to South
1	✓✓✓	✓✓✓	✓✓✓	✓✓✓
2	✓✓	✓✓✓	✓✓✓	✓✓
3	✓✓✓(1)	✓✓✓	✓✓✓	✓✓
4	✓✓✓	✓✓✓	✓✓✓	✓✓
5	✓	✓✓✓	✓✓✓	✓
6	✓	✓✓✓	✓✓✓	✓
7	✖	✖	✖	✖
8	✓✓✓(1)	✓✓✓	✓✓✓	✓✓
9	✓✓✓(1)	✓✓✓	✓✓✓	✓✓
10	✓✓✓(1)	✓✓✓	✓✓✓	✓✓
11	✓✓✓(1)	✓✓✓	✓✓✓	✓✓
12	✓✓(2)	✓✓✓	✓✓✓	✓✓✓
13	✓✓✓(1)	✓✓✓	✓✓✓	✓✓

(1) *Requires right turn TAFE entry is blocked off by traffic median*

(2) *Right turn alignment not supported by RMS*

From Table 3 it can be seen that for ease of access, it is our view that Option 1 and 12 offer the highest levels of ease of access when travelling to and from the site from either the north or south. Further, they result in the lowest levels of VKT generated by the development. Options 3 and 8 are considered similar levels of overall ease of access and VKT.

4.2 Sight Distance at Access Points

Sight distance at exit driveways under priority control is a further consideration which has been assessed for each option. Exiting vehicles under traffic signal control are not required to comply with the same standards as approaching traffic is typically held to allow vehicles to exit safely.

Sight distance from the northern end of the site was noted to be poor due to two existing issues. The first restriction on sight distance would be for vehicles crossing the boundary line where sight distance to crossing pedestrians is impeded by the existing sandstone columns. The column on the north side of the gate is a heritage column and should not be relocated. The column and wall arrangement on the southern side and the tiled pavement form part of a landscape entry statement to the park which is seen as important from a park heritage perspective and should be retained.

A further impediment to sight distance to the south for exiting vehicles is caused by the angled parking spaces on the western side of the Pacific Highway. To provide adequate sight distance for the 50km/hr zone (some 69m), extending the footway area to the edge of the through traffic lane, as proposed in the Westside Masterplan, would be required.

The same issues would arise for Options 5 and 6 where steep approach grades to the roadway and existing street trees limit sight distance to the west for both options. On the basis that no changes to parking and the road / tree network are undertaken, the following table summarises an exiting vehicle sight distance review of each option.

Table 4- Exiting Vehicle Sight Distance Comparison

Option	Sight Distance Availability	Comment
1	✓	Signal controlled
2	✓	Sight distance adequate
3	✗	Poor sight distance for existing vehicles to pedestrians crossing driveway and approaching traffic
4	✓	Sight distance adequate
5	✗	Requires removal of trees, change in footpath grades
6	✗	Requires removal of trees, change in footpath grades
7	✓	Cul De Sac frontage road, no opposing traffic
8	✓	Signal controlled
9	✗	Poor sight distance for existing vehicles to pedestrians crossing driveway
10	✗	Poor sight distance for existing vehicles to pedestrians crossing driveway
11	✗	Poor sight distance for existing vehicles to pedestrians crossing driveway
12	✓	Signal controlled
13	✗	Poor sight distance for existing vehicles to pedestrians crossing driveway

4.3 Impacts of Proposed Accesses on Surrounding Elements

Whilst the assessment in Section 5.1 assessed the ease of access arrangements for the HAC specifically, this assessment provides a further layer of analysis to gauge the potential impacts of access options on surrounding developments and the approved masterplan scheme.

It was noted that any option which provides right turn access into the site at the northern end would require a physical blocking of right turn access into the TAFE driveway. That is, a right turn bay should not accommodate right turn movements into more than one access. The potential for rear end accidents in such a situation would be very high.

Further, the masterplan scheme for the Pacific Highway includes narrowing in the proximity of the TAFE driveway and existing northern driveway. In accordance with the masterplan, in recent years angle parking was provided on the eastern side of the Pacific Highway opposite the TAFE driveway. Therefore to accommodate a right turn bay, angled parking would be lost and at best parallel parking could be considered in its place.

Having regard to the opportunities and constraints described above in Section 5.1, 5.2 and 5.3, the proposed access options have been assessed on their impacts on the surrounding infrastructure.

Table 5- Impacts of Proposed Access Assessment

Option	Impacts of Access	Comment
1	✓✓✓	Access to existing traffic signals
2	✓	Requires removal of bus shelter / relocation of bus zone. Loss of street parking (approx 8 spaces)
3	✗	Requires prevention of right turn into TAFE driveway, poor sight distance for existing vehicles to pedestrians crossing driveway. Loss of street parking (approx 6 spaces)
4	✓	Requires reconfiguration of one way entry driveway and loss of internal TAFE parking to provide two way section. Loss of street parking (approx 3 spaces)
5	✗	Would require reconfiguration of footpath levels and removal of street trees
6	✗	Would require reconfiguration of footpath levels and removal of street trees
7	✗	Access via existing street network
8	✗	Requires prevention of right turn into TAFE driveway. Loss of street parking (approx 3 spaces)
9	✓	Poor sight distance for existing vehicles to pedestrians crossing driveway. Loss of street parking (approx 3 spaces)
10	✗	Requires prevention of right turn into TAFE driveway, poor sight distance for existing vehicles to pedestrians crossing driveway. Loss of street parking (approx 3 spaces)
11	✗	Requires prevention of right turn into TAFE driveway, poor sight distance for existing vehicles to pedestrians crossing driveway. Loss of street parking (approx 3 spaces)
12	✓✓	Access to existing traffic signals. Requires removal of bus shelter.
13	✗	Requires prevention of right turn into TAFE driveway, poor sight distance for existing vehicles to pedestrians crossing driveway. Loss of street parking (approx 3 spaces)

From Table 5 it is noted that Options 1, 7 and 12 offer the least impact on surrounding infrastructure, parking and / or access arrangements of surrounding developments.

4.4 Level of Service

All options except Option 5, 6 and 7 were assessed for intersection performance. Options 5, 6 and 7 were omitted from the assessment as the traffic flows in Dural Street recorded in the Cardno report were minimal. Thus, intersection operation at the access driveway is expected to be satisfactory. Further, AM and PM peak hour restrictions at the intersection of Pacific Highway / Dural Street limit the volume of traffic in the street.

Having regard to the Level of Service Criteria in Table 1 of this report, the analysis of intersection operating conditions found the following:

Table 6 - Level of Service Analysis

Year	Intersection	Option 1		Option 2		Option 3		Option 4		Option 8		Option 9	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
2014 AM	Pacific/ Coronation	B	24.2	B	27.6	B	20.8	B	20.8	B	20.9	B	27.6
	Pacific/ HAC	N/A	N/A	A	11.4	A	11.1	A	11.1	A	11.3	A	11.4
2014 PM	Pacific/ Coronation	B	27.3	B	21.7	B	20.8	B	20.8	B	24.0	B	21.7
	Pacific/ HAC	N/A	N/A	B	27.9	B	26.1	B	26.1	B	18.7	B	27.9
2021 AM	Pacific/ Coronation	B	24.8	B	20.9	B	20.4	B	20.4	B	22.2	B	20.9
	Pacific/ HAC	N/A	N/A	A	12.4	A	12.0	A	12.0	A	12.0	A	12.4
2021 PM	Pacific/ Coronation	C	34.4	B	23.0	B	21.4	B	21.4	C	33.2	B	23.0
	Pacific/ HAC	N/A	N/A	**D /E**	**56.1**	D	48.2	D	48.2	B	27.3	**D /E**	**56.1**

It should be noted that Option 12 gave similar intersection operation results as Option 1. Options 10 & 11 are similar to option 3.

Therefore based on the resultant level of service for each scenario assessed, the following rating table has been prepared which gives a higher rating to the intersection arrangements which function at a good level of service in the future and a poor ranking for site connection arrangements which fail in the future.

Table 7 – Rating of Future Level of Service Analysis

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13
Rating	✓✓	✓	✓✓(1)	✓✓	---	---	---	✓✓(1)	✓	✓✓(1)	✓✓(1)	✓✓	✓✓(1)

(1) *Requires right turn TAFE entry is blocked off by traffic median*

From Table 6 it can be seen that the left in / left out driveways for Option 2 and 9 are operating near capacity in the year 2021. In all cases the signalised intersection of Pacific Highway / Coronation Street operates at a satisfactory level of service.

Options 1, 3, 4, 8, 10, 11 & 12 operate at a satisfactory level of service.

4.5 Internal Queuing

A further factor of consideration is the potential 95th percentile queue which results from each option and how far these queuing vehicles extend back into the site. The 95th percentile queue is the longest queue which the model estimates to occur during a peak hour. This can have impacts on the length of ramps required to service the development.

Each option was assessed using SIDRA, an RMS proprietary traffic intersection modelling program. The following represents the estimated 95th percentile internal queue length (in metres) for each option:

Figure 20 - Option 1 & 12 95th Percentile Queue

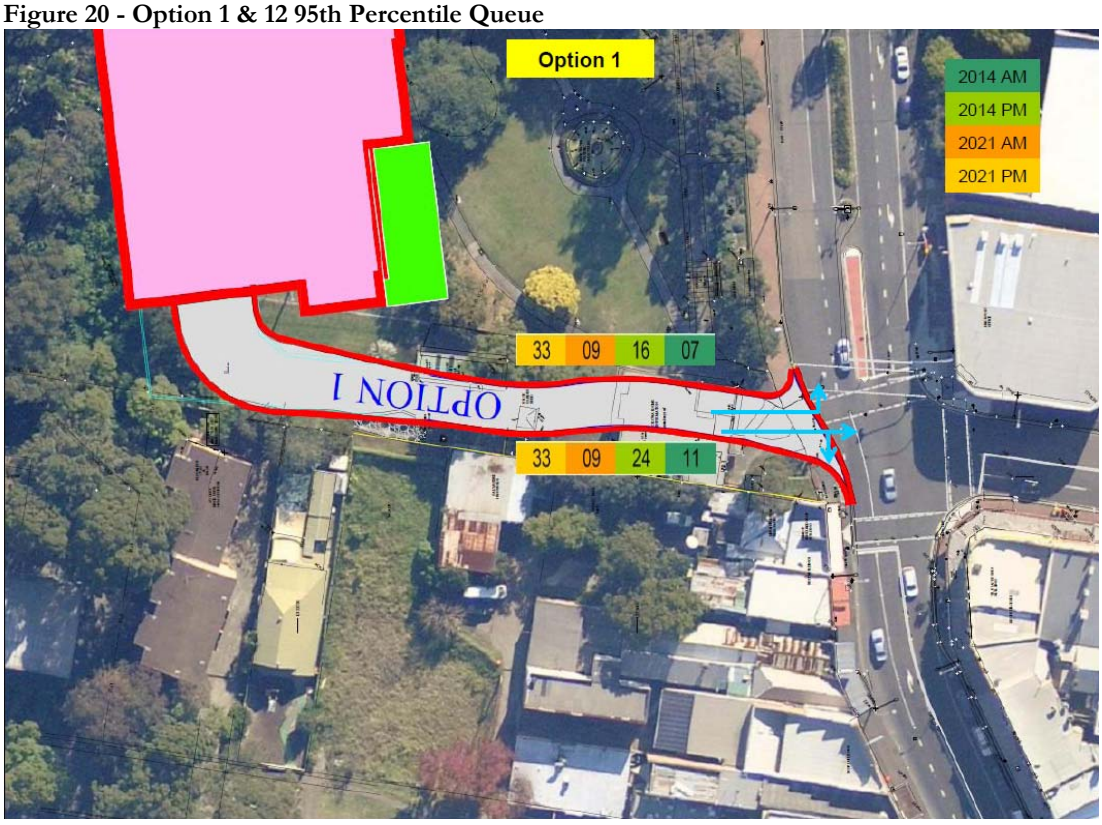
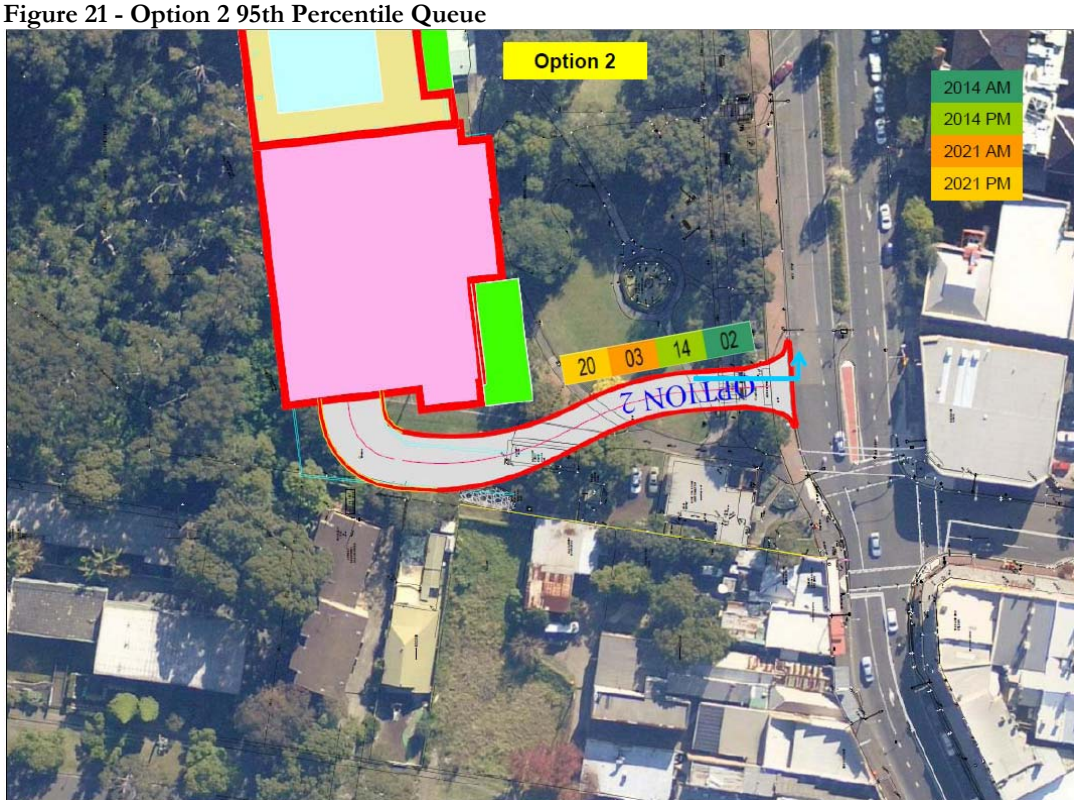


Figure 21 - Option 2 95th Percentile Queue



Option 2 shows a slight reduction in the potential 95th percentile queue vehicles are not required to exit under a specific phase as they do in Option 1.

Figure 22 - Option 3 95th Percentile Queue

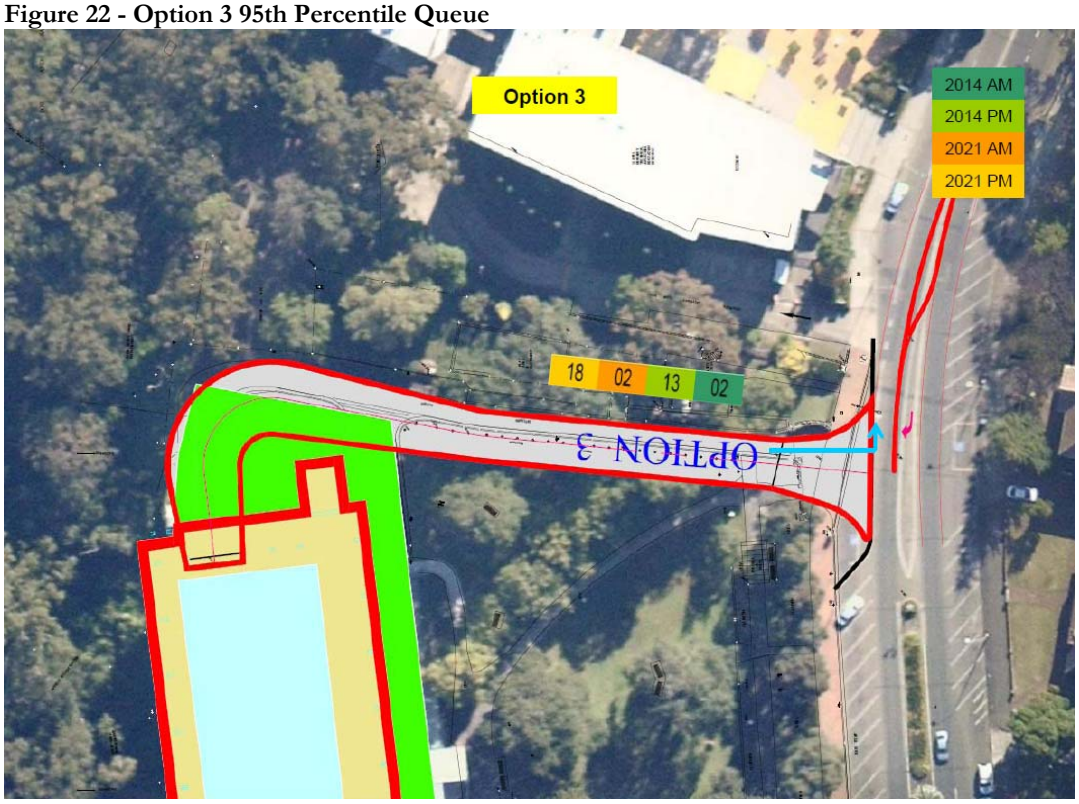


Figure 23 - Option 4 95th Percentile Queue

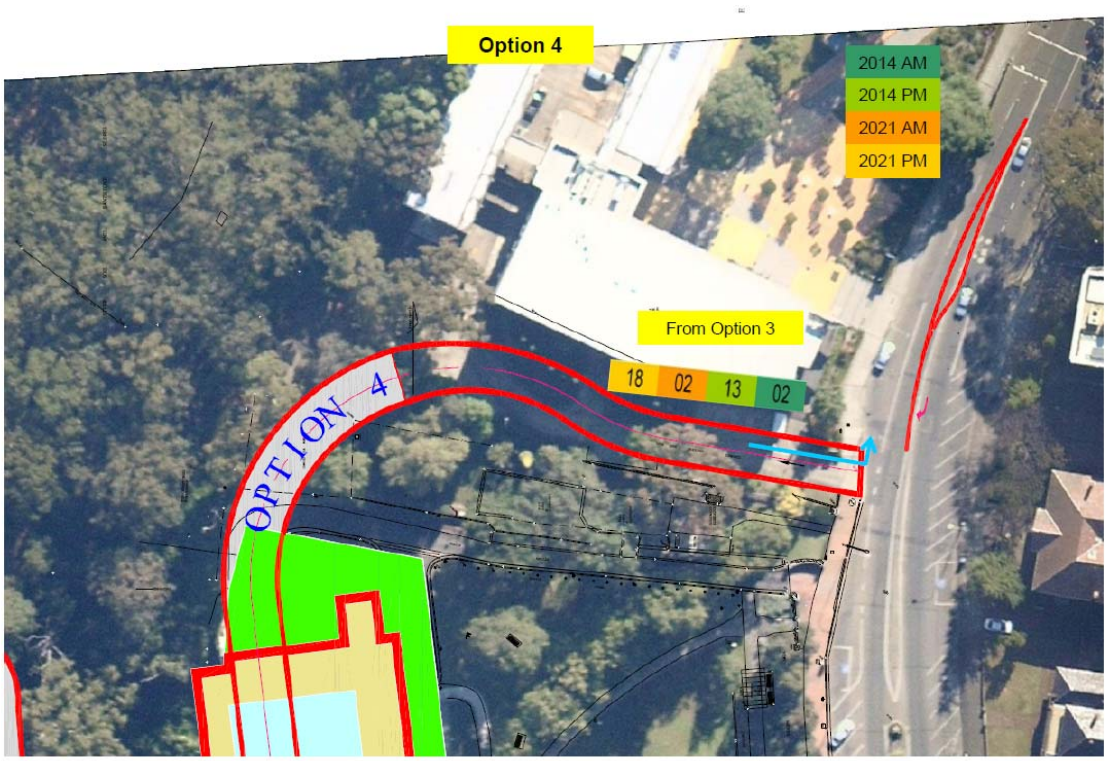


Figure 24 - Option 8 95th Percentile Queue

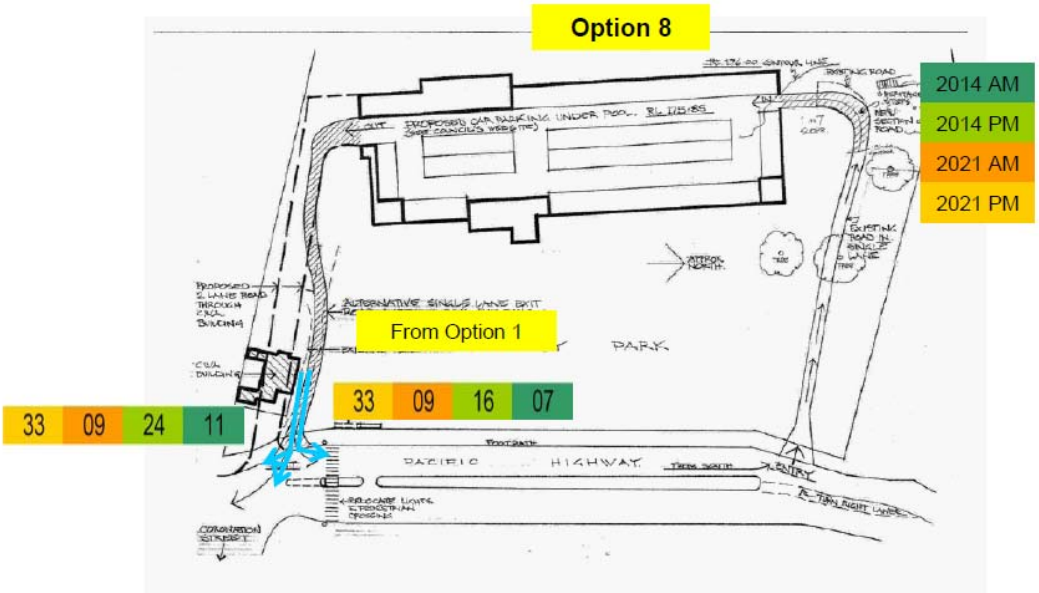


Figure 25 - Option 9 95th Percentile Queue

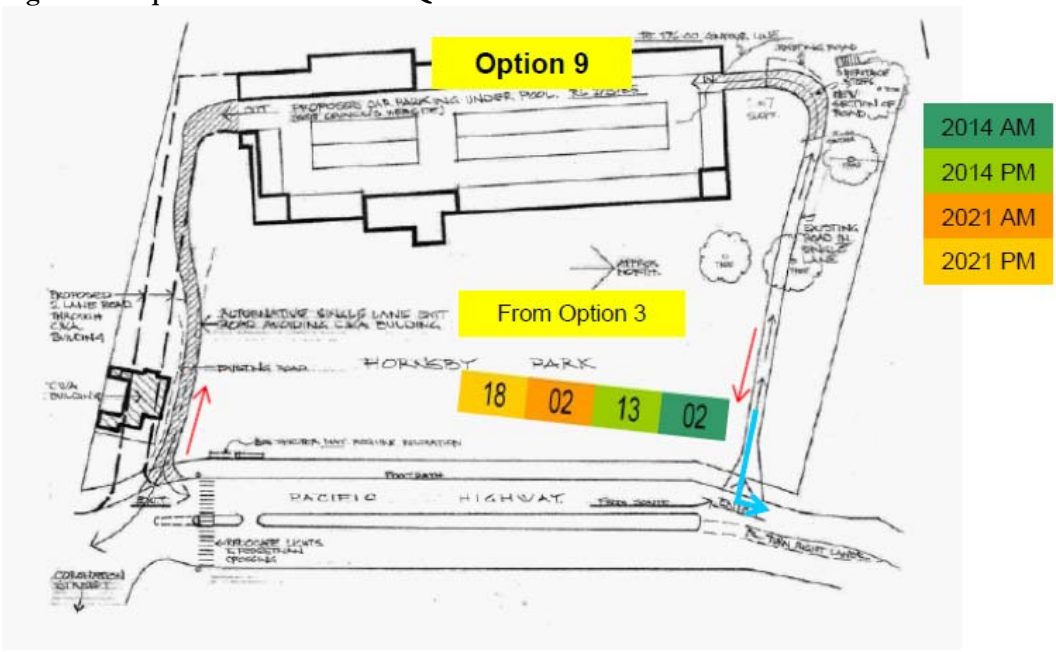
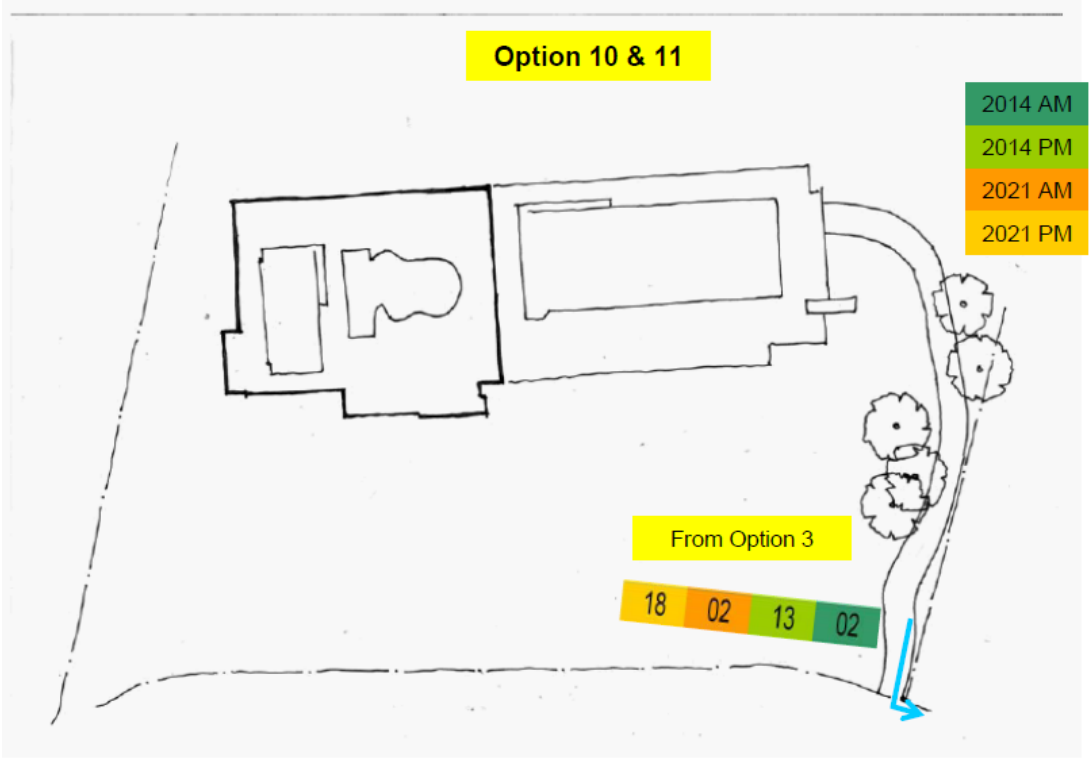


Figure 26 - Option 10 & 11 95th Percentile Queue



The need to accommodate queuing on relatively flat grades is discussed further in the ramp grade analysis below.

It should be noted that Option 12 would include the same internal queuing as Option 1 and Option 13 would include the same internal queuing as Option 3.

4.6 Internal Ramp Design

The internal ramp requirements of options with access to the Pacific Highway were assessed. That is, the ramp length required to service the site from either the southern or northern end of the site.

The ramp design requirements has been assessed for compliance with AS2890.2 - Australian Standard for Commercial Parking Facilities – AS2890.2 to accommodate a heavy rigid sized vehicle which is the largest vehicle expected to gain access internally at the site.

AS2890.2 would require the following ramp arrangements as a minimum:

Figure 27 - Option 1, 2, 8 & 12 Australian Standard Minimum Requirements

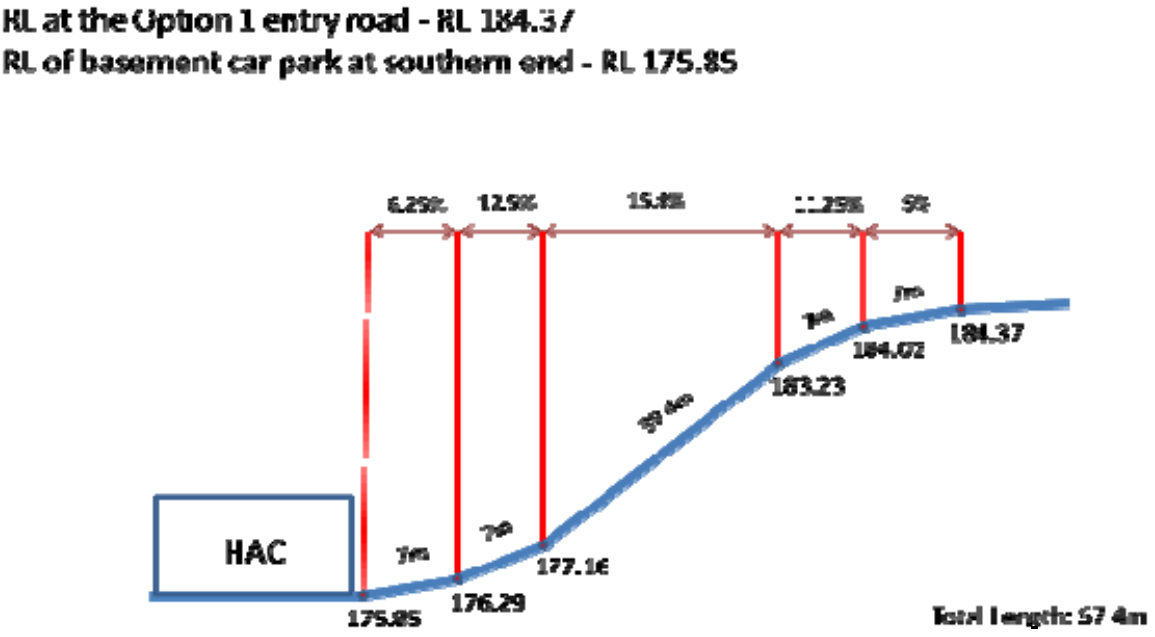


Figure 28 - Option 3 & 8 Australian Standard Minimum Requirements

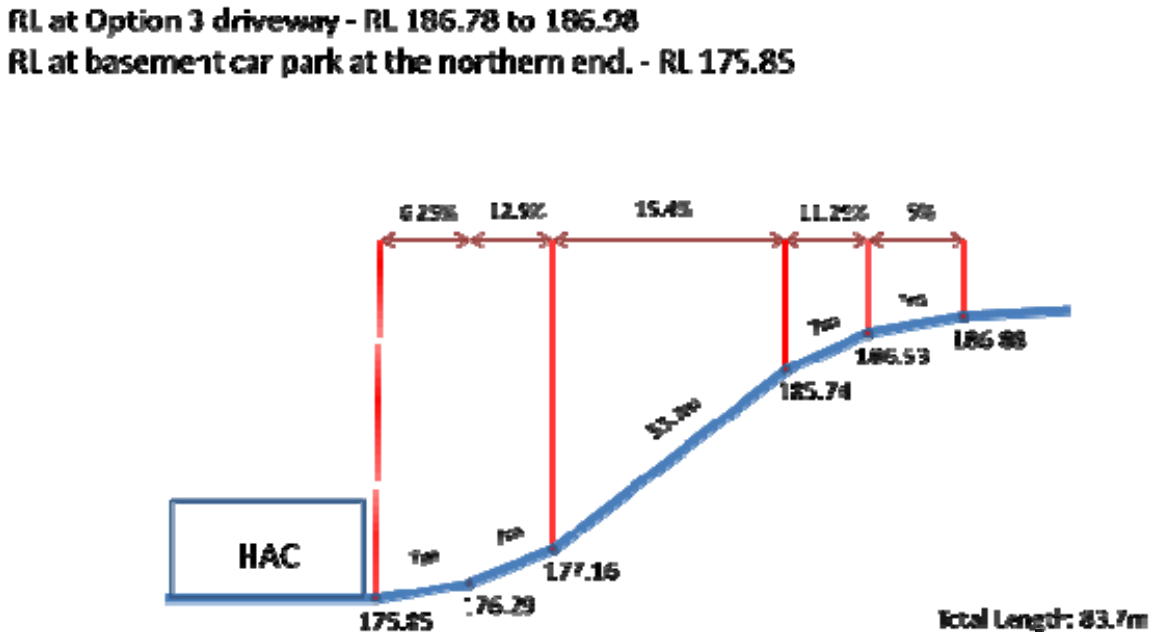
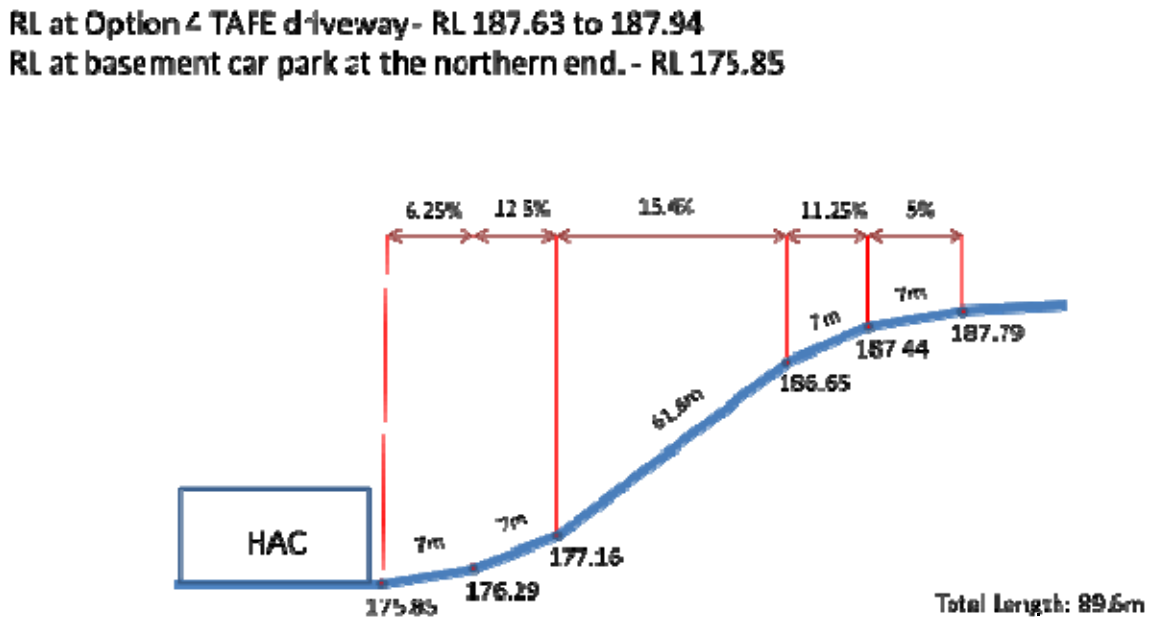


Figure 29 - Option 4, 10 & 11 Australian Standard Minimum Requirements



The resultant review of the available length to provide Australian Standard compliant ramps is provided in Table 8

Table 8- Adequate Space to provide AS Compliant Ramp

Option	Adequate Space to provide AS Compliant Ramp	Comment
1	✓	
2	✓	
3	✓	
4	×	Insufficient space to provide 90m ramp
5	✓	
6	✓	
7	✓	
8	✓	
9	✓	
10	×	Insufficient space to provide 90m ramp
11	✓	
12	✓	
13	✓	

As stated above, it is noted that the HAC carpark level of RL175.85 provides for a 3.5m clearance height at the south section of the carpark but only 2.9m clearance height under the northern section. According to AS2890.2 the clearance required for both a Heavy and Medium Rigid Vehicle is 4.5m. The clearance proposed based on RL175.85 assumes that waste is picked up outside of the carpark and that service and delivery vehicles access and egress are from the southern end.

The Australian Standard for Off Street Parking Facilities – AS2890.1 suggests that queuing should occur on ramps no greater than 10% gradient for 0.8 x the distance of the longest expected queue. This is suggested so cars are not required to undertake steep hill starts in most situations.

The 95th percentile queue requirements of each option has been added to the recommended length of ramp for compliance with AS2890.2 to gauge whether there is adequate space to provide a ramp which accommodates the majority of queuing on a relatively flat section. That is, the ramp length estimates need to be extended to provide sections of gentle grades.

The resultant ramp length requirements versus available space have been assessed with Table 9 providing a summary of which options can accommodate the appropriate ramps.

Table 9- Queue Requirements Ramp Assessment

Option	Adequate Space to provide AS Compliant Ramp	Comment
1	✓	
2	✓	
3	×	Insufficient length to provide ramp + queuing
4	×	Insufficient length to provide ramp + queuing
5	✓	
6	✓	
7	✓	
8	✓	
9	×	Insufficient length to provide ramp + queuing
10	×	Insufficient length to provide ramp + queuing
11	×	Insufficient length to provide ramp + queuing
12	✓	
13	×	Insufficient length to provide ramp + queuing

5. ROAD SAFETY & GOOD TRAFFIC MANAGEMENT

The analysis presented in the previous sections presents a review of a number of components of consideration for the assessment of each option that has been previously developed to provide access to the redeveloped HAC. Further commentary on each option is provided in the final section of this report.

In general, safe and high quality access for a development fronting a 2-4 lane road (whether it includes parking lanes or travel lanes at intersections) should endeavour to have as few access points as that are required to accommodate the potential traffic needs of the site. Further, controlled access by way of traffic signals offers the highest levels of safety for traffic turning right either into or out of the site, exiting traffic and crossing pedestrians.

Vehicular access for these types of developments should be well delineated and preferably in an controlled arrangement. Whilst right turn bay provisions can offer increased levels of safety, right turning traffic still relies on both gaps in approaching traffic and pedestrians crossing the access driveway. Again, traffic signals offer controlled movements and designated phasing for each mode.

The following table provides a view of each option proposed to date and whether the option provides good levels of safety and traffic management.

Table 10- Option Review on Safety / Traffic Management Grounds

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13
✓✓✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓✓(1)	✓

(1) Right turn alignment not supported by RMS

6. SUMMARY

After consideration of all the options available to provide access to the site, the following summary has been prepared:

Option 1

This option provides the best access arrangements for traffic travelling to and from the site. It also provides the safest access option being under traffic signal control. This option does not require pedestrians to cross two streams of exiting traffic from the HAC, and the right turn manoeuvre off the Pacific Highway has good alignment. No parking spaces will be lost with this option.

Option 2

With no right turn off the Pacific Highway, this option does not have the convenience of Option 1 but still provides reasonable levels of access for traffic travelling to and from the site. Traffic travelling on the return journey to the south is required to travel greater distances than compared with Option 1 or 12. Approximately six (6) parking spaces will be lost on the Pacific Highway with this option.

Option 3

Site distance for exiting traffic was noted to be poor. For the exit onto the Pacific Highway, extending the footway area to the edge of the through traffic lane, as proposed in the Westside Masterplan, is required. Further, there is inadequate space between the boundary and the centre to accommodate an exit ramp, including queuing which complies with AS2890.2 and provides a section of relatively flat grade to accommodate queuing in accordance with AS2890.1.

There is little opportunity to improve sight distance for exiting vehicles crossing the boundary line to pedestrians crossing the driveway.

The provision of a right turn bay into the site would prevent right turn movements into the TAFE site. Thus, whilst access to the HAC from the north would be good, TAFE trips from the north would be required to re-route via Coronation Street to gain access to the site. A diminished access arrangement for an adjacent development caused by a new development is not considered an appropriate outcome for any proposed development.

Further, the provision of any right turn bay would require removal of some of the angled parking on the eastern side of the Pacific Highway from the approved masterplan scheme. Thus this would be a further impact on proposed surrounding infrastructure provisions.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately eight (8) parking spaces will be lost on the Pacific Highway with this option.

Option 4

This option would rely on converting a driveway which is currently used by TAFE for approximately 79 parking spaces and an unloading area. Further, grading of any ramp could not occur until some distance within the TAFE site. The ramp requirements do not make this option feasible and this option should not be considered further.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 5 / 6

These options assume access from Dural Street. The site inspection revealed a steep grade between the footpath level on the northern side of the street and the street carriageway. Further, sight distance to the west is essentially non – existent due to large street trees within the nature strip on the northern side of the street which all would have to be removed.

The steep arrangement between the footpath and the street would not be acceptable as it would require vehicles to enter the street from a steep upgrade. There is a significant potential for vehicles to roll back whilst endeavouring to commence a hill start to enter the street. This is in turn increases the potential for pedestrians walking behind waiting vehicles to come in contact with these vehicles.

There is no opportunity to raise the footpath levels on the northern side of the street as this would impact on the existing driveway to the block of units immediately west of the preschool.

The peak hour restrictions at the intersection of Pacific Highway / Dural Street further impede ease of access to the site from Dural Street. It would require the removal of on street parking on the eastern side of the Pacific Highway adjacent to existing street retail development to facilitate a right turn bay southbound. This is not considered a viable option to potentially allow the removal of the peak hour turning restrictions.

Both Option 5 and 6 whilst providing the opportunity for adequate lengths of ramps to be provided are not considered workable and should not be considered further.

Option 7

This option provides the poorest access arrangements of any options considered. Access to the site would be convoluted for all traffic and would rely on 'local knowledge' of the surrounding residential street network. It would result in vehicles travelling large distances (compared with Pacific Highway access options) when making their way to and from the site.

As with Option 5 and 6, turning restrictions at the intersection of Pacific Highway / Dural Street further impede access.

This option is not considered viable in terms of access arrangements and should not be considered further.

Option 8

The sketch plan prepared shows an exit driveway at the Coronation Street / Pacific Highway signalised intersection.

The Australian Standard for Off Street Parking Facilities – AS2890.1 states that driveway access points should not be located within intersections. Thus, as a standard low order driveway the exit at the intersection could not be supported. Further, to facilitate right turn exit movements, the driveway would need to be connected to the traffic signal phasing. The RMS requirements are that this needs to be designed as a roadway and not a driveway and requires a dedicated left turn lane.

As with Option 3, the provision of a right turn bay into the site would prevent right turn movements into the TAFE site. That is, a diminished access arrangement for an adjacent development caused by a new development is not considered an appropriate outcome for any proposed development. In addition, a right turn bay would require the deletion of angled parking from the approved masterplan scheme. Thus this would be a further impact on proposed surrounding infrastructure provisions. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 9

This option is a reversal of Option 8. However, as it would involve the provision of an entry driveway within the intersection of Pacific Highway / Coronation Street it would not comply with AS2890.1. This would need to be designed as a roadway and connected to the traffic signals. As with Option 3 the sight distance exiting the site is poor.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 10

This arrangement is considered a hybrid of Option 3 and 4 and therefore would offer reasonable levels of access compared with some other options. However, the length of ramp requirements at the northern end of the site make it not possible to provide the length of ramp required to comply with AS2890.2 and to accommodate a reasonable proportion of the expected 95th percentile queue for exiting vehicles in accordance with AS2890.1.

As with Option 3, the provision of a right turn bay into the site would prevent right turn movements into the TAFE site. That is, a diminished access arrangement for an adjacent development caused by a new development is not considered an appropriate outcome for any proposed development.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 11

The benefit of this option is it may provide the adequate length of ramp required to accommodate compliance with AS2890.2 and the 95th percentile queue. However, the cost to provide an elevated two way roadway to accommodate a heavy rigid vehicle would be significantly greater than other options.

As with Option 3, it would provide reasonable levels of access and the provision of a right turn bay into the site would prevent right turn movements into the TAFE site. That is, a diminished access arrangement for an adjacent development caused by a new development is not considered an appropriate outcome for any proposed development.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 12

This option would provide all the benefits that Option 1 provides and maintain the Women's Rest Centre building. A deficiency of the Option 12 arrangement compared with Option 1 is that pedestrians walking on the western side of the street would be required to cross two roadways instead of one. Further, the greater than 90 degree right turn from Pacific Highway would not be supported by RMS.

Option 12 would require the relocation of the existing bus zone on the western side of the Pacific Highway and would require demolition of the existing bus shelter to provide safe pedestrian sight distance. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

Option 13

It is unclear as to the finer details of this option to make an independent judgement on its viability. However, on access grounds the option suffers from the same issues with Option 3. That is, poor sight distance for traffic exiting the site to both pedestrians crossing the driveway and to the south to northbound traffic in the Pacific Highway. It would require the removal of on street angled parking on the western side of Pacific Highway to achieve Australian Standards stopping sight distance minimum requirements. For the exit onto the Pacific Highway, extending the footway area to the edge of the through traffic lane, as proposed in the Westside Masterplan, is required.

Any sort of right turn bay provision would prevent right turn movements into the TAFE development. If the access was envisaged to be left in / left out only, access to / from the HAC would be considered the lowest ease of access of any of the options. There would be further impacts with the loss of the proposed angled parking on the eastern side of the Pacific Highway to accommodate right turn bay.

The provision of a right turn lane into the site and a left turn out only controlled by signage may result in dangerous (and illegal) unauthorised right turn manoeuvres onto the Pacific Highway. Approximately three (3) parking spaces will be lost on the Pacific Highway with this option.

APPENDIX A

M^CLAREN TRAFFIC ENGINEERING
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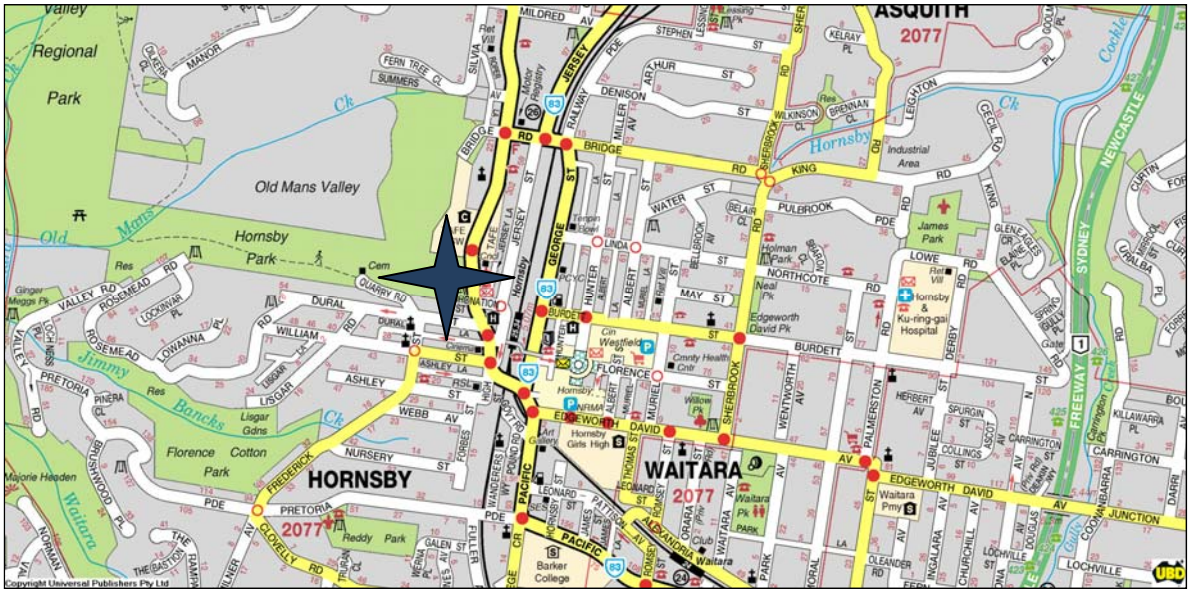
28 September 2011 2010/089.L03 CM/sm

Hornsby Shire Council
C/o Peter Hunt Architect
Suite 8, 100 Bay Road
WAVERTON NSW 2060

Attention: Mr Michael Cook
Dear Michael,

PROPOSED REDEVELOPMENT OF
HORNSBY AQUATIC CENTRE, PACIFIC HIGHWAY, HORNSBY
TRAFFIC & PARKING IMPACT ASSESSMENT

This report provides an assessment of the car parking needs and traffic impact assessment of created on-site car parking for the proposed redevelopment of the existing Hornsby Aquatic Centre (HAC) located within the town centre of Hornsby, as shown in the UBD extract below.



1 ON-SITE CAR PARKING EVALUATION

The HAC facility is located within the town centre of Hornsby and is well served by public transport services. In this regard, Hornsby Train Station is within an easy 250m walking distance (less than 5 minute) and regular bus services operate from the train station with some services operating along the Pacific Highway frontage of the site.

The existing HAC provides essentially no on-site car parking for visitors or staff, except for the recently installed disabled parking bay near the plant room.

The parking demand for the proposed redevelopment is best gauged from the expected change in peak usage in terms of the change in the pool areas, as identified in **Table 1** below, as Council's DCP does not provide a specific rate to apply.

TABLE 1: PROPOSED SCALE OF DEVELOPMENT CHANGE FOR PROPOSED REDEVELOPMENT [PEAK SUMMER PERIOD] @ 9.30am*

USE	EXISTING SCALE	PROPOSED SCALE	CHANGE
MAIN POOL	50m	50m	Nil
LEARN TO SWIM	16 Students	32 Students	+16 Students
LAP SWIMMING	10 Adults	20 Adults	+10 Adults
AQUAROBICS	10 Adults	30 Adults	+20 Adults
LEISURE POOL	2 Adults	10 Adults	+8 Adults
STAFF			
❑ Admin	4	6	+2
❑ Kiosk	0	2	+2
❑ Life Guards	2	2	Nil
LEARN TO SWIM & AQUAROBICS STAFF	5	9	+4

* Advised that squads at 4.30pm will not see a significant increase in patronage

The scale of increase is largely attributed to the expected increase in the "Learn To Swim / Lap Swimming / Aquarobics / Leisure" pool activities due to the increase in size of the pools.

The additional peak parking demand is estimated from first principles that adopt rates of:

- ❑ 1 car per additional staff member.
- ❑ 1.5 students per car plus a tolerance factor equivalent to a 100% increase in the student number applied to take account of arriving groups of students whilst another group is being trained.
- ❑ 2 adults per car (which includes an allowance for public transport users and walkers).

The resulting additional peak parking demand equates to 49 parking spaces (i.e. [(2 x 16 = 32 students) / 1.5 = 22 cars] + [(38 adults / 2) = 19 cars] = 41 visitors plus 8 staff), but say 50 spaces. The proposed alterations and additions include on-site parking for 111 car spaces, of which 4 are accessible spaces. Thus the proposed on-site car parking supply exceeds the worst case parking demand by 61 spaces based upon the additional expected vehicles from staff and patrons. The additional parking provided will ensure that staff and patrons will lessen the use of local on-street parking.

2 ADEQUACY OF PROPOSED SIGNALISED ACCESS TO AQUATIC CENTRE

Further to your request, the undersigned has evaluated the performance of an upgraded vehicular access serving the Hornsby Aquatic Centre via a fourth (western leg) connection to the existing Pacific Highway / Coronation Street traffic signals (refer to **Annexure A**), incorporating the following design elements as shown in **Annexure B**:

- A 15m long right turn bay for vehicles entering the Aquatic Centre car park from the north.
- Road profile for the access road serving the Aquatic Centre.
- Design swept path vehicle being the 8.8m long Medium Rigid Vehicle (MRV) in accordance with AS2890.2-2002.
- Pedestrian actuated phase and cross walk across the western leg (Aquatic Centre) access road in line with the western footpath of Pacific Highway with audio tactic treatment and pram ramps to RTA / Council specifications.

- Adjustment to signal phase timing and sequence to provide at least a 60 second cycle time and "COCO" (i.e. conventional phase sequence) for the main road and side roads, or alternative phase sequence to RTA's requirements.

- Peak hourly counts dated 30 June 2011 (Copy attached in **Annexures C & D**).

The proposed upgrade of Hornsby Aquatic Centre will include on-site provision for some 111 car parking spaces (including 4 accessible spaces) accessed via the traffic signalised intersection with Pacific Hwy / Coronation Street.

For the proposed 111 parking spaces, the peak hourly generation on a weekday evening (5pm to 6pm) from the CARDNO analysis is assumed to be a worse case of 200 vehicles (100 in; 100 out). The undersigned expects that pool use will peak outside of the AM & PM commuter peaks, typically well before 8am and after 6pm with a more likely peak of 130 vehicles, comprising 76 inbound and 54 outbound trips during the 6pm to 7pm period. During the 6pm to 7pm weekday period, the total traffic volumes through the intersection will be much lower than the weekday 8-9am peak hour period.

The traffic assignment is expected to be 58% north and 42% south, thus for the weekday 6pm to 7pm period, the traffic generation is as follows (similar loads were also added to the 8-9am peak as a worst case):

- 44 inbound trips from the north, 32 from the south.
- 31 outbound trips to the north, 23 to the south.

The performance of the upgraded intersection was evaluated with the aid of the SIDRA program and was found to perform at an acceptable Level of Service "C" condition which represents "SATISFACTORY" performance.

The maximum queue in the right turn bay (Pacific Hwy north of intersection) was two (2) vehicles during the assessed existing peak hourly periods. A test of estimated future 2021 traffic volumes through the intersection was also conducted based upon a recent regional traffic study, which found that the peak queue length within the proposed 15m right turn bay for traffic entering the Aquatic Centre car park was less than 10m in all cases assessed (both existing & future 2021). The SIDRA summary tables are presented in **Annexure E**.

Accordingly the proposed 15m long right turn bay for entry to the Aquatic Centre is acceptable in the circumstances.

In relation to the on-site car parking and servicing plan it is recommended that the design satisfy the following requirements:

- A minimum clear headroom of 3.5m for the intended maximum height service truck.
- A minimum clear headroom of 2.5m above all disabled car parking spaces.
- A general minimum clear headroom of 2.3m of areas only traversed by cars (no service vehicles)
- On-site car parking spaces to comply with AS2890.1-2004 & AS2890.6-2009.
- Maximum gradient of 1:6.5 along the ramp adequate for service vehicles & cars.

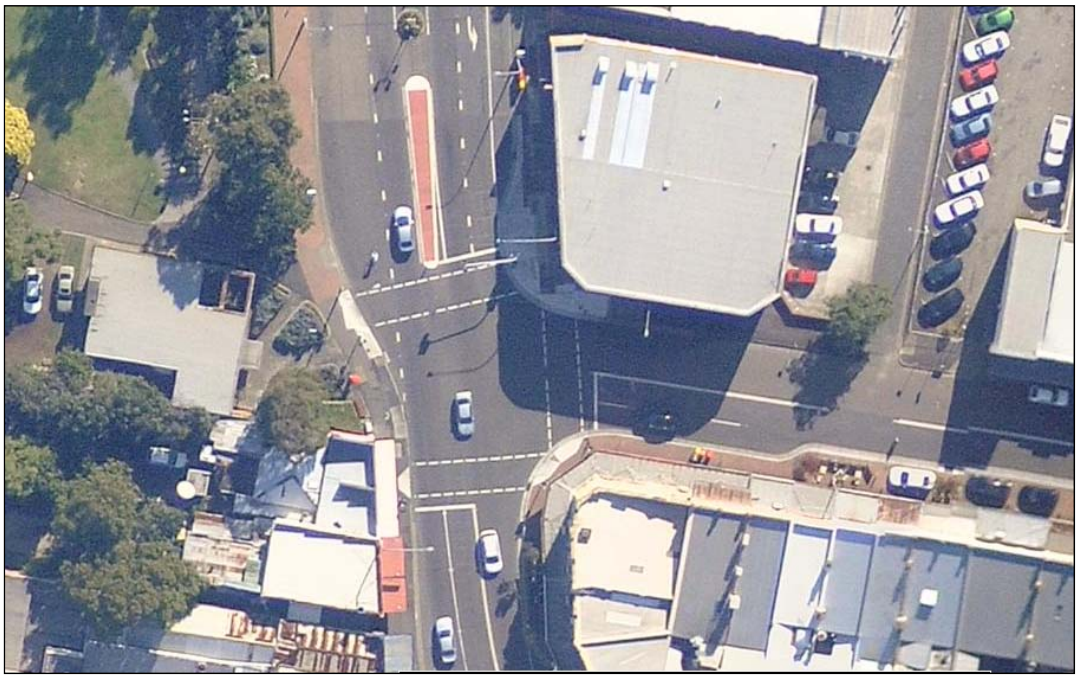
Finally, we present in **Annexure F** a copy of the recent micro-simulation report prepared by CARDNO dated 9 August 2011 which was requested by Hornsby Shire Council. That report confirms with the use of both PARAMICS and SIDRA that *"the impacts to road network performance are negligible. There is a Level of Service (LoS) B achieved at Pacific Highway / Coronation Street with and without the development in place."* The CARDNO conclusion supports our analysis.

Please contact the undersigned should you require further information or assistance.

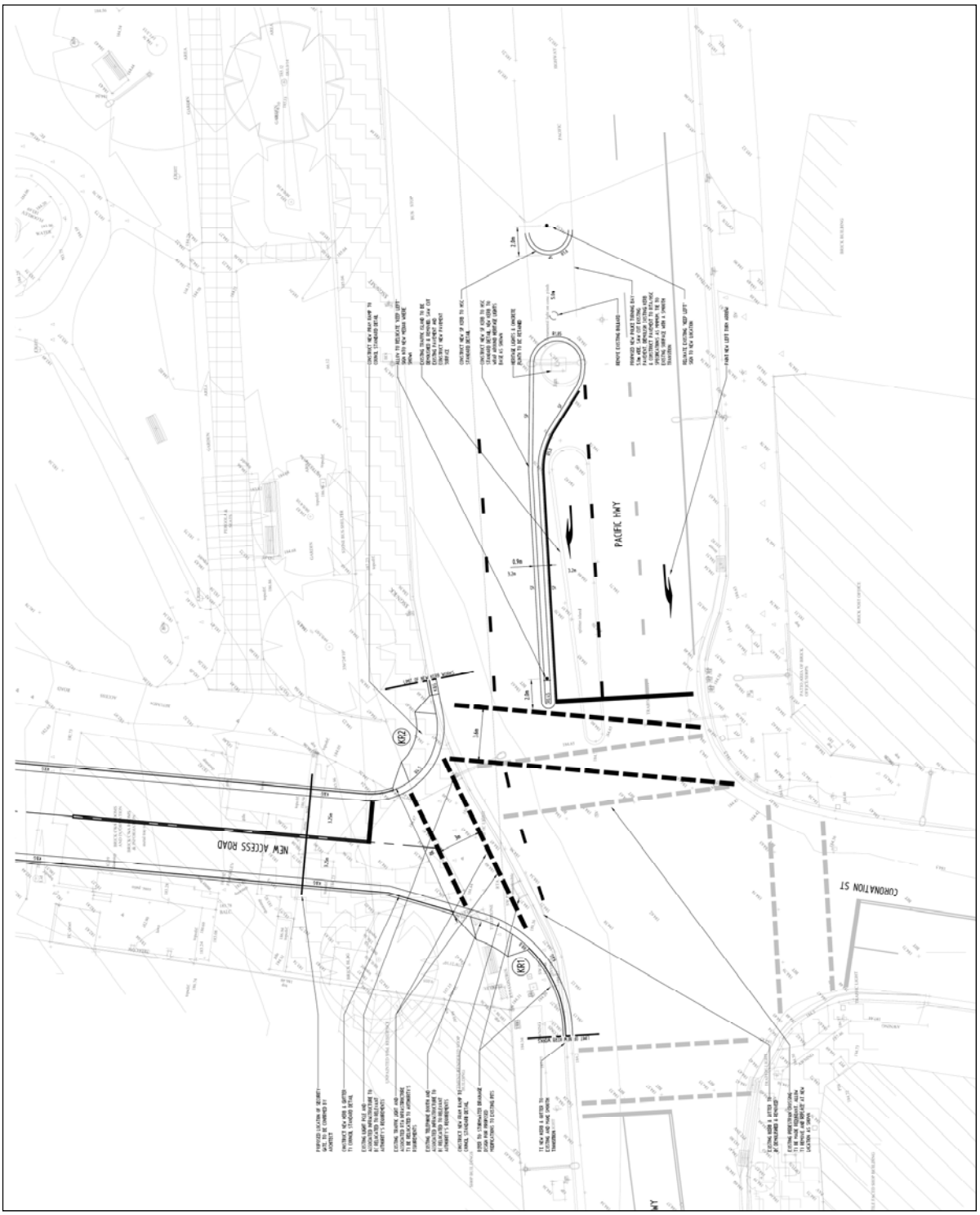
Yours faithfully

M^CLAREN TRAFFIC ENGINEERING
Craig M^CLaren
Director

ANNEXURE A: EXISTING TRAFFIC SIGNAL CONTROL OF PACIFIC HIGHWAY & CORONATION STREET



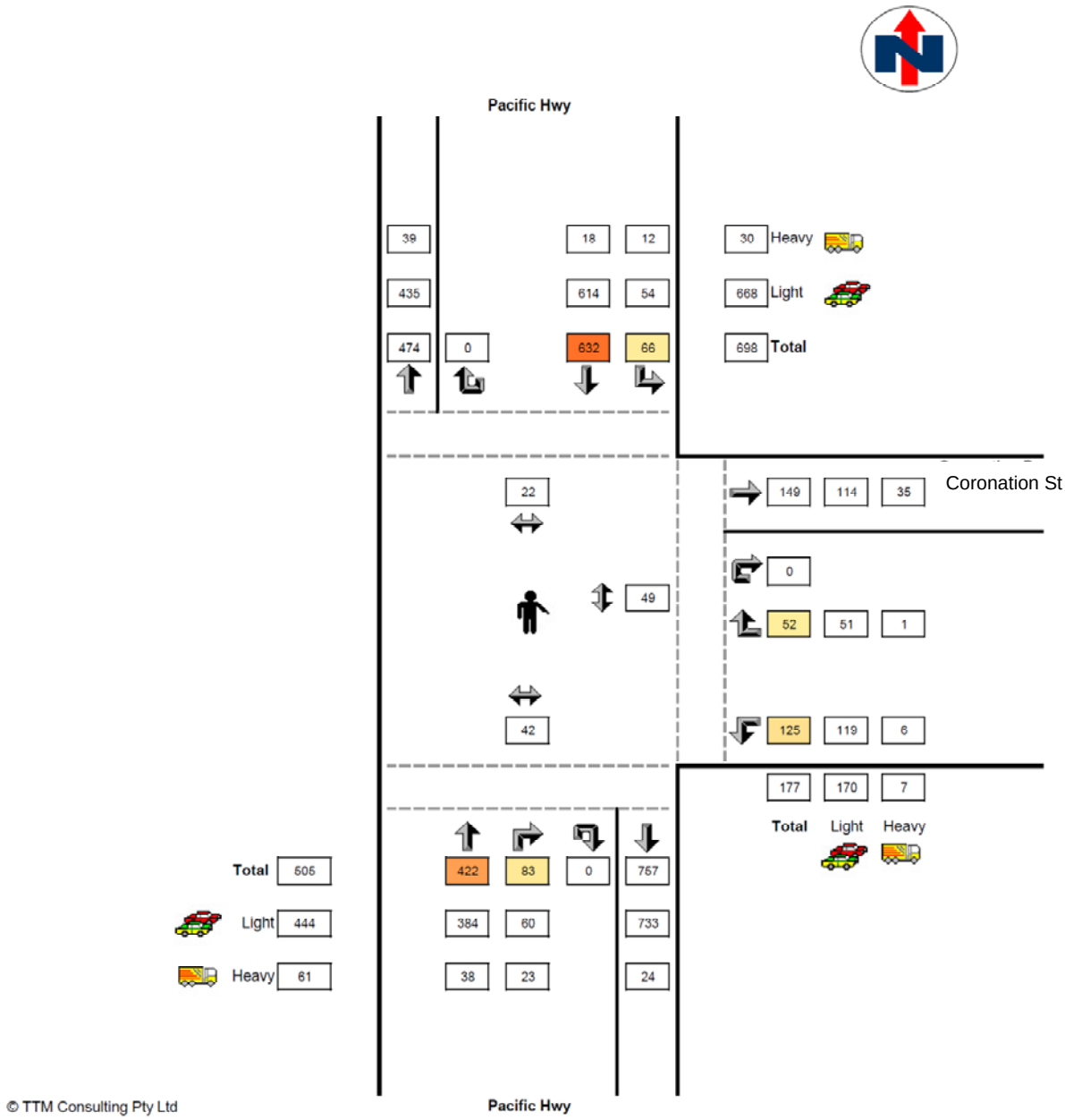
ANNEXURE B: PROPOSED SIGNALISED ACCESS TO HORNSBY AQUATIC CENTRE



ANNEXURE C: EXISTING AM PEAK HOURLY TRAFFIC FLOWS

TTM Reference: 80803
Location: Pacific Hwy & Coronation St
Suburb: Hornsby
Date: Thursday 30-06-11
AM Peak 0815-0915
Weather: Light showers 's AM / Fine PM

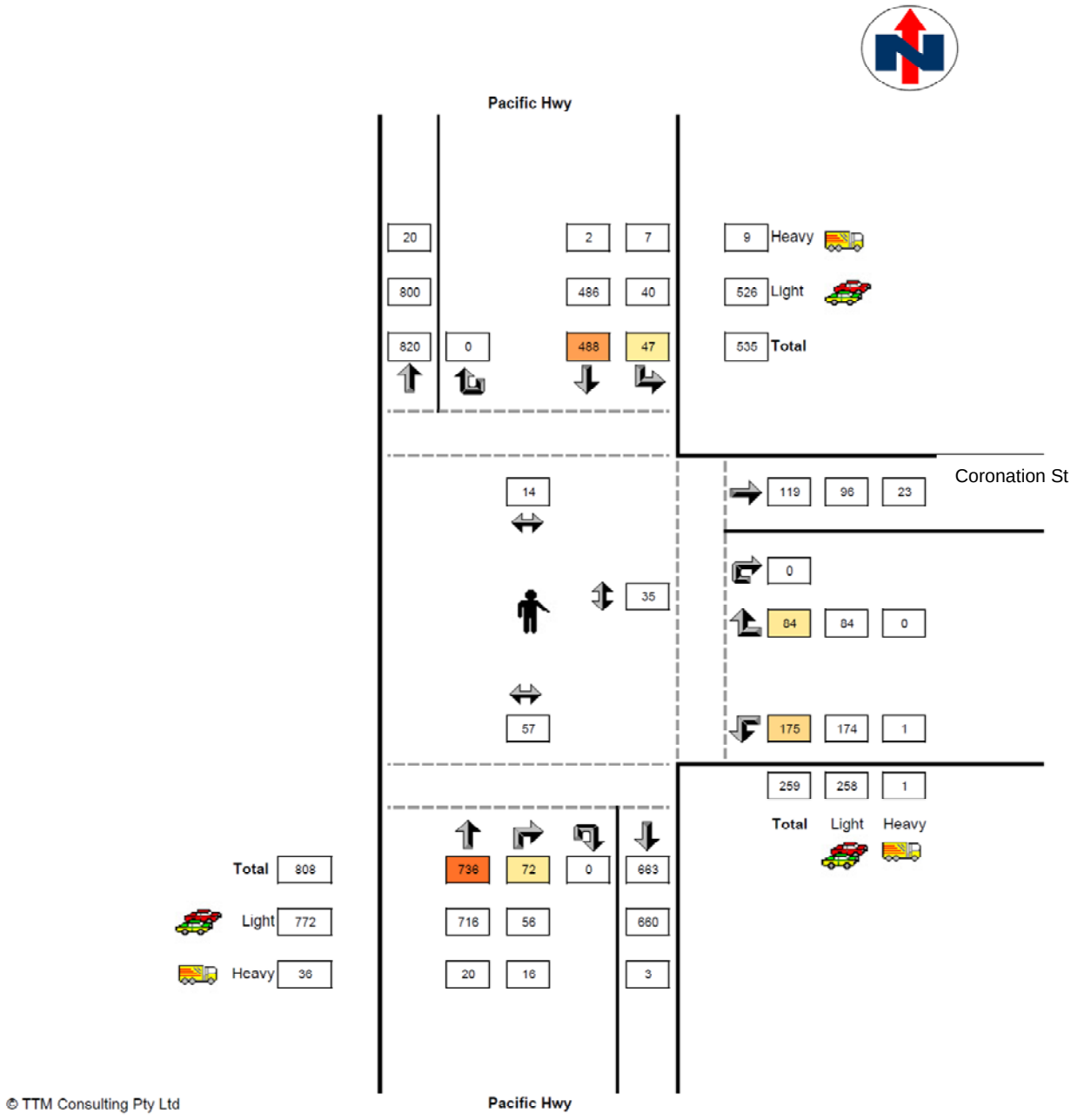
www.ttmgroup.com.au



ANNEXURE D: EXISTING PM PEAK HOURLY TRAFFIC FLOWS

TTM Reference: 80803
Location: Pacific Hwy & Coronation St
Suburb: Hornsby
Date: Thursday 30-06-11
PM Peak 1630-1730
Weather: Light showers ; AM / Fine PM

www.ttmgroup.com.au



ANNEXURE E: SIDRA SUMMARY PERFORMANCE TABLES FOR THE INTERSECTION OF PACIFIC HIGHWAY / CORONATION STREET / FUTURE ACCESS ROAD SERVING THE 111 SPACE CAR PARK FOR THE HORNSBY AQUATIC CENTRE : 3 PHASE*

M^CLAREN TRAFFIC ENGINEERING 2011 RESULTS

MTE AM PEAK RESULTS

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/vehicle)	Level of Service(3)	Control Type
Pacific Hwy/ Coronation Street	8.00-9.00 AM	0.80	22.4	**C**	Signals

* Right Turn Bay on Pacific Hwy (North) = 1 vehicle

MTE PM PEAK RESULTS

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/vehicle)	Level of Service(3)	Control Type
Pacific Hwy/ Coronation Street	6.00-7.00 PM	0.87	25.3	**C**	Signals

* Max queue in Right Turn Bay on Pacific Hwy (North) = 2 vehicles

M^CLAREN TRAFFIC ENGINEERING FORECAST 2021 RESULTS

CARDNO FACTORED + MTE AM PEAK RESULTS

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/vehicle)	Level of Service(3)	Control Type
Pacific Hwy/ Coronation Street	AM	0.85	25.1	**C**	Signals

* Max queue in Right Turn Bay on Pacific Hwy (North) = 1 vehicle

CARDNO FACTORED + MTE PM PEAK RESULTS

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/vehicle)	Level of Service(3)	Control Type
Pacific Hwy/ Coronation Street	PM	0.86	27.7	**C**	Signals

* Max queue in Right Turn Bay on Pacific Hwy (North) = 2 vehicles

NOTES : (1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced by the most disadvantaged movement under stop / give way or roundabout control modes.

(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst.

ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 1 of 8)

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Ref CES01221

Date 09 August 2011

HORNSBY AQUATIC CENTRE INTERSECTION ASSESSMENT

1 INTRODUCTION

Cardno was recently commissioned by Hornsby Shire Council to carry out an assessment of the operational impacts that the proposed the Hornsby Aquatic Centre (HAC) is likely to have on the Pacific Highway/Coronation Street intersection in Hornsby.

Previously, Cardno built traffic micro-simulation models using Paramics software, for Hornsby as part of a separate project, Hornsby Quarry Infill tests; these models all contain the Pacific Highway / Coronation Street intersection and so were easily upgraded to include the HAC.

This proposal to develop HAC includes a new western leg at Pacific Highway/Coronation Street to provide access into the HAC's car park. An additional 15.3 metres right turn bay has been added to the northern leg of Pacific Highway to accommodate the right turners into the proposed development so as to mitigate potential queuing.

The assessments have been undertaken using the 2014 scenario, which is the projected opening year for the development. The traffic modelling and assessment details for this study are as follows:

- AM Peak, Business Peak (BP) and PM Peak models were developed for 2014 to include the upgraded Pacific Highway/Coronation Street/HAC intersection
- Demands matrices were applied to the models by interpolating the 2010 and 2021 matrices already used for previous Hornsby Quarry Paramics modelling studies.
- 2014 base models were run to establish the road network performance without HAC development.
- Incorporated HAC's projected traffic demands based on information supplied by Council.
- Run the 2014 traffic models with the Aquatic Centre access in place as per designs supplied by Council.
- Visual assessment was undertaken in Paramics for each peak period to assess the impacts of the development proposals, especially the intersection configuration.
- SIDRA analysis was carried out for Pacific Highway/Coronation Street with and without HAC development scenarios in place.

2 MODELLED SCENARIOS

As discussed, previous modelling was carried out by Cardno using Paramics for the Hornsby Quarry project. The modelling tasks completed for the project include a base model calibrated and validated to 2010 AM, Business and PM peak traffic data. The base model was subsequently used to model the 2010 and 2021 scenarios with and without the quarry traffic in place.

For the assessment of Pacific Highway/Coronation Street intersection in proposed HAC development, it was agreed with Council that the following 2014 scenarios only would be modelled in Paramics.

2.1 2014 BACKGROUND TRAFFIC GENERATION

2021 background traffic demands increases were established for the Hornsby quarry models based on the housing and townhouse strategies, and the estimated residential and employment forecasts as supplied by Council. For the purpose of this assessment, it was decided that the 2014 additional background traffic demands will be derived by interpolating the 2010 and 2021 demands in the study area, as developed previously.

2.2 HORNSBY AQUATIC CENTRE TRAFFIC GENERATION

Added to the 2014 demands were the additional vehicles projected to use the HAC. Table 2.1 shows the assumptions relating for number of patrons entering and leaving HAC in 2014, for each 15 minute intervals during the peak-hour in each of the AM, PM and Business Peak periods; consideration has also been given to the Learn to Swim and Squad Classes that are operating. The vehicular demands for HAC were established based on average car occupancy of 1.5 patrons per vehicle.

Table 2.1 Traffic Generation for HAC

Peak Period	TIME		No. of Patrons		No. of Vehicles[1]	
	From	To	IN	OUT	IN	OUT
AM Peak[2] (7.30am – 8.30am)	7:30:00	7:45:00	20	20	13	13
	7:45:00	8:00:00	55	20	37	13
	8:00:00	8:15:00	20	20	13	13
	8:15:00	8:30:00	55	20	37	13
Business Peak (3.00pm – 4.00pm)	3:00:00	3:15:00	20	20	13	13
	3:15:00	3:30:00	55	20	37	13
	3:30:00	3:45:00	20	20	13	13
	3:45:00	4:00:00	55	20	37	13
PM Peak (5.00pm – 6.00pm)	5:00:00	5:15:00	20	55	13	37
	5:15:00	5:30:00	55	20	37	13
	5:30:00	5:45:00	20	55	13	37
	5:45:00	6:00:00	55	20	37	13

[1] No. of vehicles based on 1.5 patrons per vehicle.

[2] As the patronage information is not provided for these times, it is assumed the number of patrons visiting the aquatic centre in the AM Peak is similar to the Business Peak period.

ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 3 of 8)

Cardno Shaping the Future

2.2.1 DISTRIBUTION

Based on a survey carried out in December 2010, it is estimated that 46% of the proposed development traffic will travel to/from south and 54% to/from north. The following Table 2.2 shows the distribution split of the traffic demands applied to the models.

Table 2.2 Distribution Split

Peak Period	TIME		No. of Vehicles		No. of Trips			
					From South	From North	To South	To North
	From	To	IN	OUT	46%	54%	46%	54%
AM Peak (7.30am – 8.30am)	7:30:00	7:45:00	13	13	6	7	6	7
	7:45:00	8:00:00	37	13	17	20	6	7
	8:00:00	8:15:00	13	13	6	7	6	7
	8:15:00	8:30:00	37	13	17	20	6	7
Business Peak (3.00pm – 4.00pm)	3:00:00	3:15:00	13	13	6	7	6	7
	3:15:00	3:30:00	37	13	17	20	6	7
	3:30:00	3:45:00	13	13	6	7	6	7
	3:45:00	4:00:00	37	13	17	20	6	7
PM Peak (5.00pm – 6.00pm)	5:00:00	5:15:00	13	37	6	7	17	20
	5:15:00	5:30:00	37	13	17	20	6	7
	5:30:00	5:45:00	13	37	6	7	17	20
	5:45:00	6:00:00	37	13	17	20	6	7

ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 4 of 8)

Cardno Shaping the Future

2.2.2 PROFILES

Profiles, as presented in Table 2.3, have been developed in the Paramics models to simulate the demands entering and exiting HAC in 15 minutes interval. The purpose of developing profiles for the models is to assess the impacts of the expected peak demands arriving/leaving the aquatic centre just before classes start/end within a 15 minute periods.

Table 2.3 Profiles for Development Traffic

Peak Period	TIME		Demands Profiles			
			From South (Zone 1 – Zone 19)	From North (Zone 8 – Zone 19)	To South (Zone 19 – Zone 1)	To North (Zone 19 – Zone 8)
AM Peak (7.30am – 8.30am)	7:30:00	7:45:00	13%	13%	25%	25%
	7:45:00	8:00:00	37%	37%	25%	25%
	8:00:00	8:15:00	13%	13%	25%	25%
	8:15:00	8:30:00	37%	37%	25%	25%
Business Peak (3.00pm – 4.00pm)	3:00:00	3:15:00	13%	13%	25%	25%
	3:15:00	3:30:00	37%	37%	25%	25%
	3:30:00	3:45:00	13%	13%	25%	25%
	3:45:00	4:00:00	37%	37%	25%	25%
PM Peak (5.00pm – 6.00pm)	5:00:00	5:15:00	13%	37%	13%	37%
	5:15:00	5:30:00	37%	13%	37%	13%
	5:30:00	5:45:00	13%	37%	13%	37%
	5:45:00	6:00:00	37%	13%	37%	13%

ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 5 of 8)

Cardno Shaping the Future

2.3 PACIFIC HIGHWAY/CORONATION STREET

Figure 2.1 and Figure 2.2 shows the intersection layout as per modelled in both the SIDRA and Paramics software respectively.

Figure 2.1 Intersection Layout coded in SIDRA

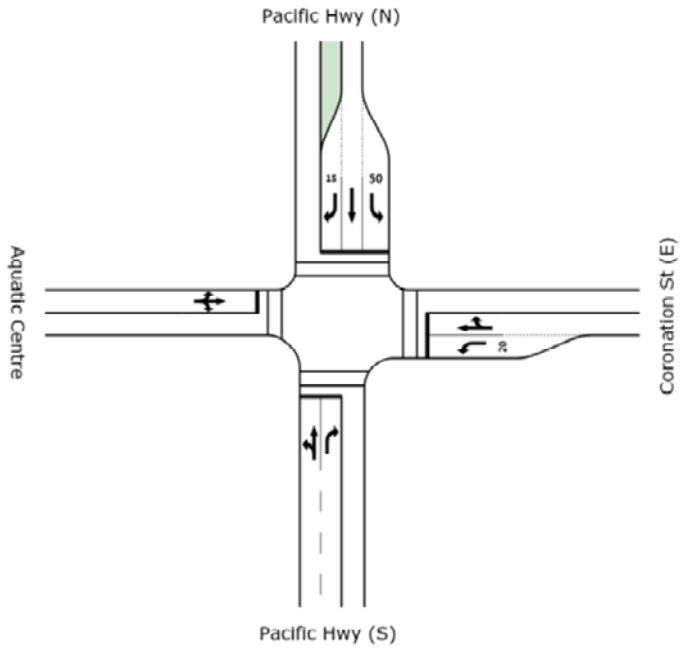
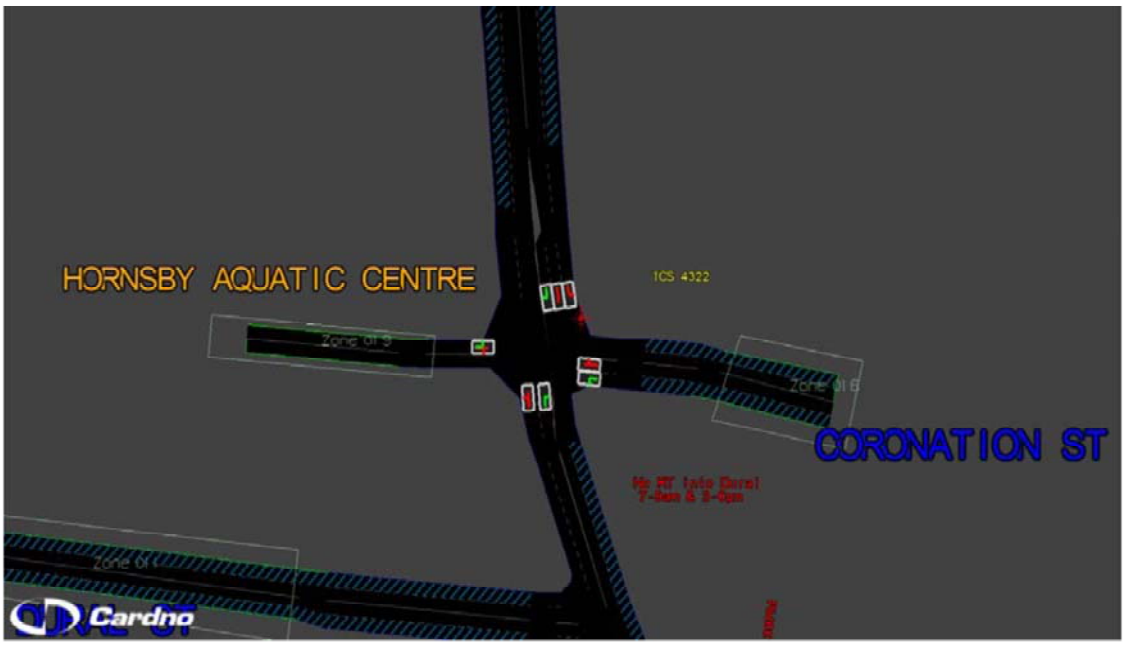


Figure 2.2 Intersection Layout as coded in Paramics



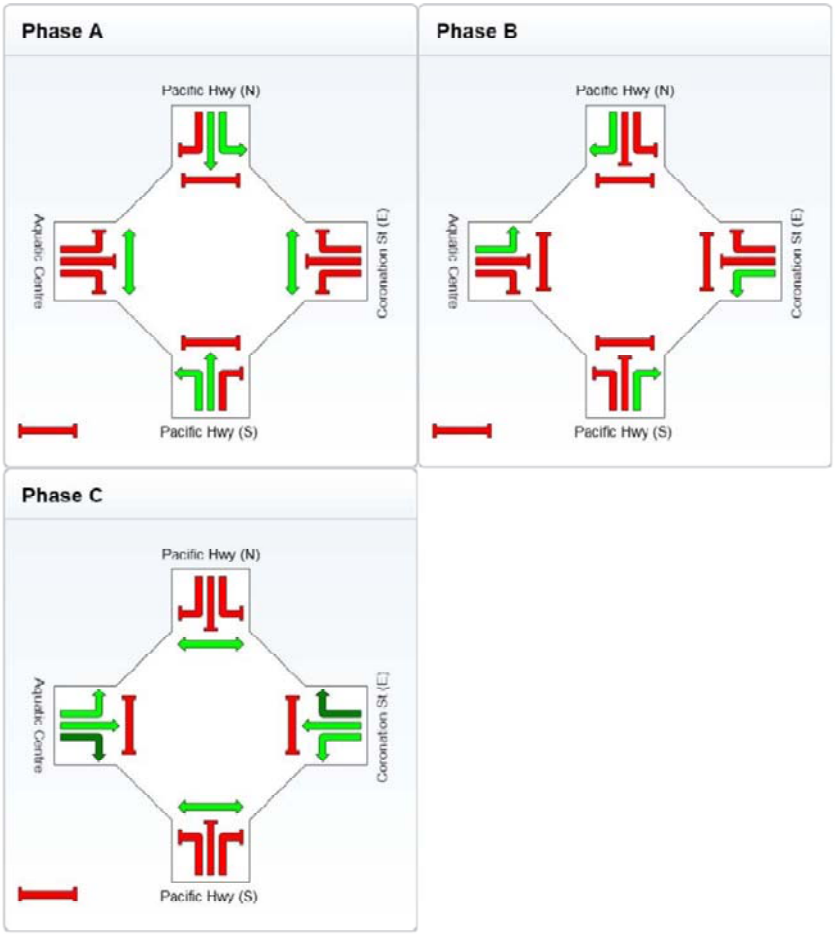
ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 6 of 8)

Cardno
Shaping the Future

2.3.1 PHASING ARRANGEMENTS

The new phasing arrangements coded for the intersection of Pacific Highway/Coronation Street are shown in Figure 2.3. Vehicles from the north accessing HAC are controlled by signalised dedicated right turn movements only; this eliminates conflict with south bound vehicles thereby optimising safety for road users.

Figure 2.3 Phasing Arrangements



ANNEXURE F: CARDNO REPORT DATED 9 AUGUST 2011 (Page 7 of 8)

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3 PARAMICS MODELLING VISUAL ASSESSMENT

Following the input of the set of data discussed above, the models were run and optimised for a visual assessment of the proposed developed with particular attention given to the intersections surrounding HAC.

Following are the results of the visual assessment:

- Overall, the network modelled for the study operates satisfactorily with no significant areas of congestion with HAC development in place. The busiest peak scenario occurs in the PM peak between 5.00pm to 6.00pm.
- There are no significant impacts on the intersection of Pacific Highway/Station Street/William Street in terms of increased queue lengths or delays with the additional HAC traffic demands.

  Queues on Pacific Highway/Coronation Street intersection are operational only and generally clear in one cycle for both northbound and southbound vehicles on Pacific Highway.

  The short 15 metre right turn bay into HAC from Pacific Highway generally stores 2 vehicles (sometimes nearly 3 depending on vehicle size) per cycle.
- In instances where there are more than 3 vehicles on the storage bay, the queue encroaches onto the median lane, but causes no significant queuing or delay to the southbound through traffic because the numbers turning into HAC never reach sufficient lengths to cause queuing.
- The queue for vehicles waiting to turn right into HAC does not extend up to the 15 minute parking zone adjacent to the post office. It is also observed that there are generally no queues on the left turn lane into Coronation Street which will enable southbound through traffic to pass the right turn queued vehicle by doing a 'S' manoeuvre based on the proposed lane arrangement.

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4 INTERSECTION ASSESSMENT

Intersection assessment for Pacific Highway/Coronation Street using the SIDRA 5.0 software was undertaken for the modelled scenarios. The traffic volumes entered into SIDRA for analyses were extracted from the Paramics model run outputs.

The results presented in Table 4.1 show the following results:

- Pacific Highway/Coronation Street operates at a Level of Service B for all peak periods with and without the development traffic in place.
- Average delays for the intersection during peak periods do not exceed more than 30 seconds for the modelled scenarios.

Table 4.1 Overall SIDRA Results for Pacific Highway/Coronation Street

Scenario	Degree of Saturation	Average Delays (s)	Level of Service
2014 Base AM	0.859	21.7	B
2014 Base AM+HAC	0.826	24.3	B
2014 Base BP	0.683	15.0	B
2014 Base BP+HAC	0.836	24.6	B
2014 Base PM	0.853	19.9	B
2014 Base AM+HAC	0.864	26.1	B

5 CONCLUSION

In conclusion, the SIDRA analysis and the Paramics visual assessments, which are attached as '.avi' movie files, show that the impacts to road network operations are negligible. There is a Level of Service (LoS) B achieved at Pacific Highway / Coronation Street with and without the development in place.

In addition, as can be seen from the enclosed Paramics movie files, there are no additional queues caused by turners into or out of the proposed HAC development, with only operational queuing in both the 'with' and 'without' scenarios due to normal Highway signalisation.

Based on these tests it is recommended that the junction configuration as proposed in the development proposals and as tested here be endorsed by the planning authority.

PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN SERVICES

APPENDIX B

LEVEL 1, 364 KENT STREET, SYDNEY NSW 2000 TEL 82703500 FAX 82703501 WWW.CITYPLAN.COM.AU
CITY PLAN SERVICES PTY LTD ABN 30 075 223 353
CITY PLAN STRATEGY & DEVELOPMENT PTY LTD ABN 58 133 501 774
CITY PLAN URBAN DESIGN PTY LTD ABN 41 107317 206
CITY PLAN HERITAGE PTY LTD ABN 46 103 185 413

THE IMPACT OF 13 VEHICULAR ACCESS OPTIONS

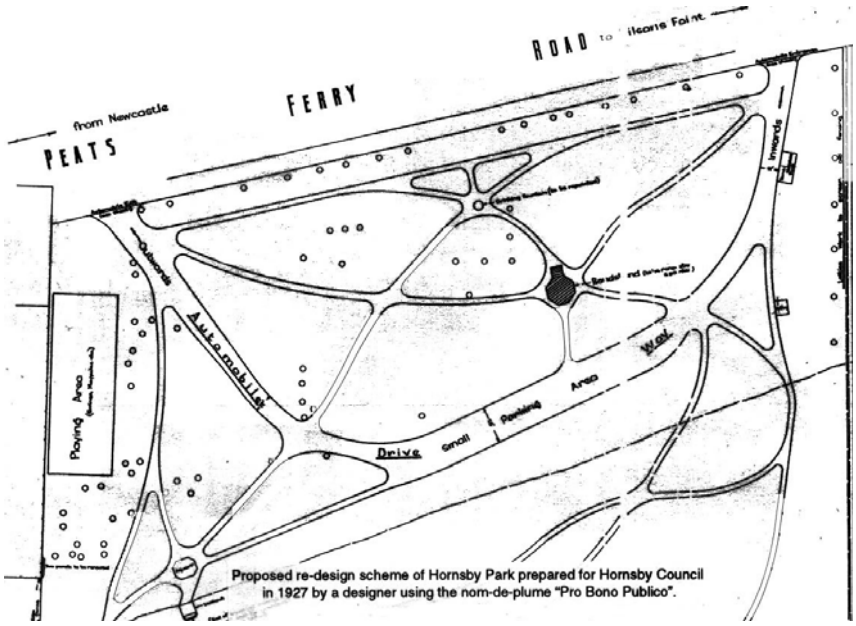
TO THE PROPOSED NEW AQUATIC CENTRE

ON

THE LANDSCAPE HERITAGE VALUES

OF

HORNSBY PARK



Prepared at the request of
Hornsby Shire Council

by

Mayne-Wilson & Associates
Conservation Landscape Architects
Paddington NSW 2021

4 April 2012

Introduction

This report attempts to summarize and update the previous Heritage Impact Assessment of various vehicle access options to the proposed new Aquatic Centre at Hornsby Park prepared by Mayne-Wilson & Associates (MWA) in October 2011. It also draws on the Heritage Study and Landscape Plan which MWA prepared for Council in 1996, the full, revised version of which clearly identified the heritage landscape values of the park and its component elements. (For the purposes of this report, 'the park' means the developed section between the Pacific Highway and the edge of the escarpment.) A little repetition is involved here, in order to make certain points very clear, and to provide information which it would seem that those preparing recent heritage listings of one built item, namely the Women's Rest Centre, in the park did not take into full account.

A Heritage Landscape Architect's position

From a heritage perspective, it is considered that access option 5 would have the least impact on the heritage values of Hornsby Park, and it remains our first preference. However, as the land over which a access road would need to be built would have to be purchased by Council, and given the numerous practical constraints associated with it enumerated by other consultants and Council officers, it became necessary to consider a more feasible option.

It is considered that option 1 is the next preferable option, because it has the least adverse impacts on the heritage fabric and values of the park than any of the others, except option 6. However, option 6 is excluded because that site is of heritage significance – for both historical and social reasons. (It is outside the park, and its heritage values are not linked to it in any way).

We share the view that although the Women's Rest Centre has some (moderate) significance, the landscape and other values of the park are of a higher level. It is our opinion that the recently cited heritage values of the Women's Rest Centre are over-stated, and appear to have been formulated somewhat *'in vacuo'*.

Summary Statement of Heritage Significance

The 1996 Heritage Study that MWA prepared in 1996 assessed that:

- Hornsby Park has local historical significance as a recreation reserve created in 1898 for the enjoyment of residents of Hornsby and has been used continuously for that purpose since then.

- Hornsby Park has social significance as a place for carnivals, shows, celebrations (including naturalization ceremonies since the 1970s), and as a place for passive recreation and contemplation. Since 1962, with the establishment of the swimming centre, it has also been used for active recreation. Over the last 80 years it has received various inputs from the local community, who hold it high esteem. The Women's Rest Centre has some modest social significance as a building to serve the needs of members of that Association, and more recently other groups in the community, which it has done continuously for the last 50 years.

- Hornsby Park has aesthetic significance as a good local example of the influence of 'City Beautiful' precepts on park design in the 1920s and 30s, as well as of the influence of local Australian designers, stimulated particularly by the writings and plans of Edna Walling.

- The original view down to Old Mans Valley once had high aesthetic value, although it has since been obscured by the development of the Hornsby Pool and the regeneration of the bushland beyond. (It is noted that the new Aquatic Centre will re-establish part of that view.)

- The Park has negligible technical or research significance, and is not rare. It is, however, a good representative example of its type, is relatively intact, and is well maintained.

None of the structures added since 1940 - including the Women's Rest Centre, the rock slab fountain, the Rotary picnic area, and the 1962 swimming pool - have paid any regard to the original City Beautiful precepts and Edna Walling-style layout or elements of the Park, and have no aesthetic value.

The existing swimming pool complex, the fountain, and to a lesser extent the toilet block are all discordant and intrusive elements, and should be removed or replaced with better designed structures in harmony with the interwar character of the park, as recommended in MWA's 1996 Concept Plan.

The Park is identified in Council's LEP as a site of regional heritage significance. However, the Heritage Office and the State Government's Standard Instrument no longer recognize the regional level of significance for heritage items. Accordingly, where Council's existing heritage list identifies items as having regional significance, these default to an assessment as items of local significance.

The following table summarizing the park's landscape values:

Item	Date	Degree	Comments
Planted traffic island & lights	1920s	High	Central, linking element of civic & park precinct
Pergolas	c.1934	High	Integral part of the 1930s park furnishings
North-south axial path with sandstone paving & edging	c. 1934	High	Key component of City Beautiful layout & style
Central axial path	c. 1934	High	Intact & germane to City Beautiful style
Turpentine trees	Not known	High	Probably regrowth from original forest.
Curved sandstone wall, north side of north entrance	c. 1934	High	Matching wall on south side removed long ago. Replaced with different wall c. 1998.
Dry stone wall along driveway	? 1930s	Medium	Intact, possibly Depression era labour
Memorial to Thomas Higgins	1989	Low	Recent commemorative plaque
Lone Pine (seed from Gallipoli)	1937	Medium	Provided by WWI soldier
View down to Old Mans Valley	1890-1962	Originally High	Presently blocked by swimming pool and bushland beyond
Site of schoolboys' vegetable garden	1915-18	Low	Abandoned by 1920; no longer evident
Magnolia tree at southern entrance	c. 1940	Low	Still in good condition, marks park entrance

It would seem that those who prepared the listing for the Women's Rest Centre had not actually read the 1996 assessment of the park's landscape's heritage values, as they do not appear to have a full appreciation of the context in which to evaluate the relative significance of that building. In the recent listings there was no apparent understanding of the City Beautiful theme and Edna Walling influences of the park as it was designed in 1927 and laid out in the 1930s, and no realization that the modernist style of the Women's Rest Centre was out-of-character with that style. It is our opinion that far from contributing to the park's intrinsic character, the actual style, fabric and siting of the building detracted a little from it.

This is not to say that the Women's Rest Centre had no social significance – it clearly has had. However, the CWA themselves have moved out of it, and will be accommodated in the new Aquatic Centre, so that principal, social purpose of the existing 1950s building is now part of history. The

provision of a Country Women's Centre in Hornsby as late as 1958 was something of an anomaly, because it was already an urban area by then, not 'country'. Half a century later, it is even less so, and the numbers of 'country women' actually using the building have dwindled. For that reason, they have let the building to a variety of local community groups in recent decades. It would seem that as the CWA members are most unlikely to use the new room being made available for them in the proposed Aquatic Centre every day of the week, then those other groups who currently use the Women's Rest Centre should surely be able to use the new facility too. The ability to meet and socialize at the park will therefore remain – it is just that the venue would be changed (and improved) in a new space only a few metres away from the present one.

We do not consider the Women's Rest Centre is of sufficient value to retain when by doing so it creates problems for, and/or undesirable impacts on, quite a number of the other, older and higher values placed on the landscape elements and character of the park as a whole. Among those valuable elements is the semi-circular, or somewhat 'D' shaped driveway (now a pathway) that formed one of the main access elements into the park. This is outlined by the dashed red line on the original winning design of the park in 1927, as shown in Figure 1 below:

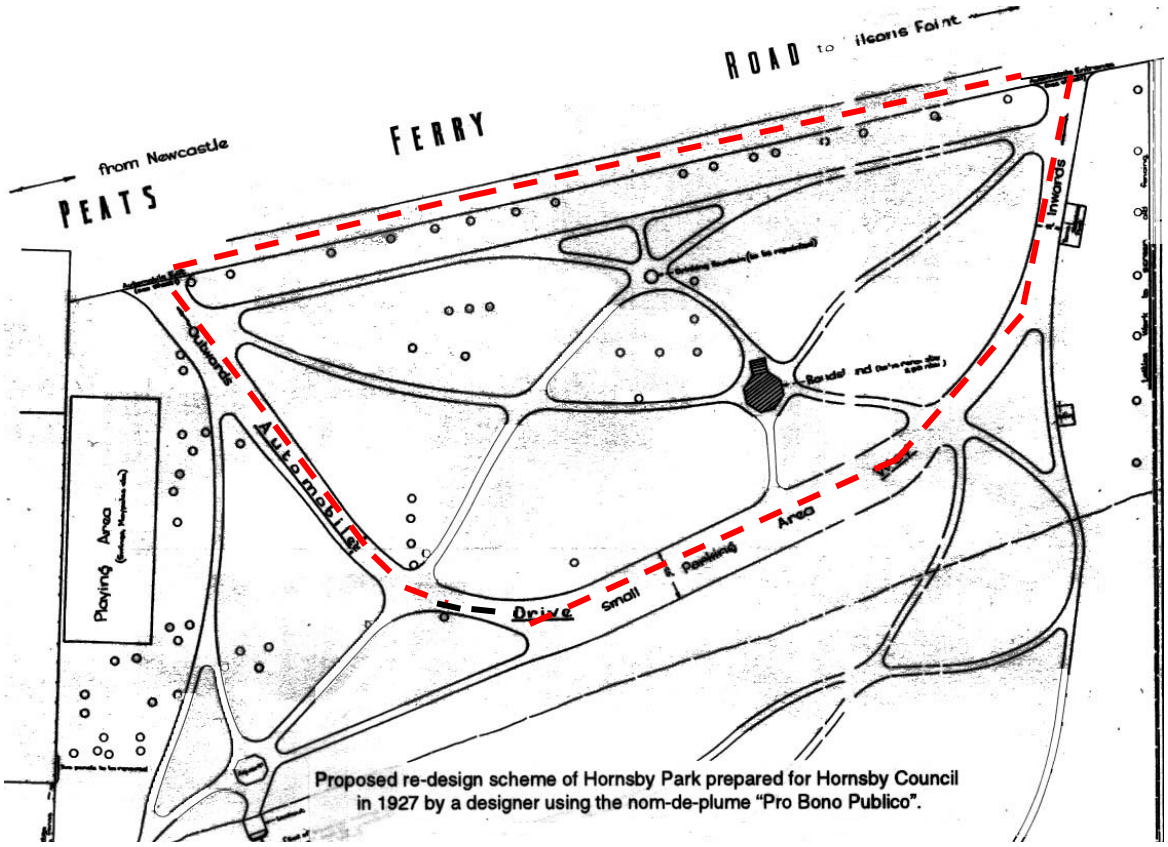


Fig. 1 The plan submitted by Scott Finlay and Jack Dow, under the nom-de-plume of 'Pro Bono Publico' won the 1927 competition and was gradually implemented over the ensuing decade.

Their plan recognized that members of the public would like to be able to drive to the edge of the 'escarpment', park there briefly, and enjoy the arcadian view down to Old Mans Valley (shown below). (A similar scheme was devised in the 1930s for the Coronation View Point Park on the Pacific Highway at Lane Cove.)

Fig. 2 A 1929 photograph of the view down into Old Man's Valley from Hornsby Park

The original Access option 1 shown below, was based on the assumption that the Women's Rest Centre was not of sufficient heritage significance for it to be retained, and could therefore be removed.

Fig. 3 The original Options 1 and 2.

The overall architectural plan for the new Aquatic Centre, and the associated landscape master plan, shows that the key landscape elements would be minimally affected by Option 1. In particular, the D-shaped pathway and the old pergolas would remain in place, and a balancing Jacaranda avenue could be planted along the southern curve to match that on the northern side of the 'D' pathway. A revised and refined version of Access Option 1 is shown in Figure 4 below:

Fig. 4 Option 1 - revised version

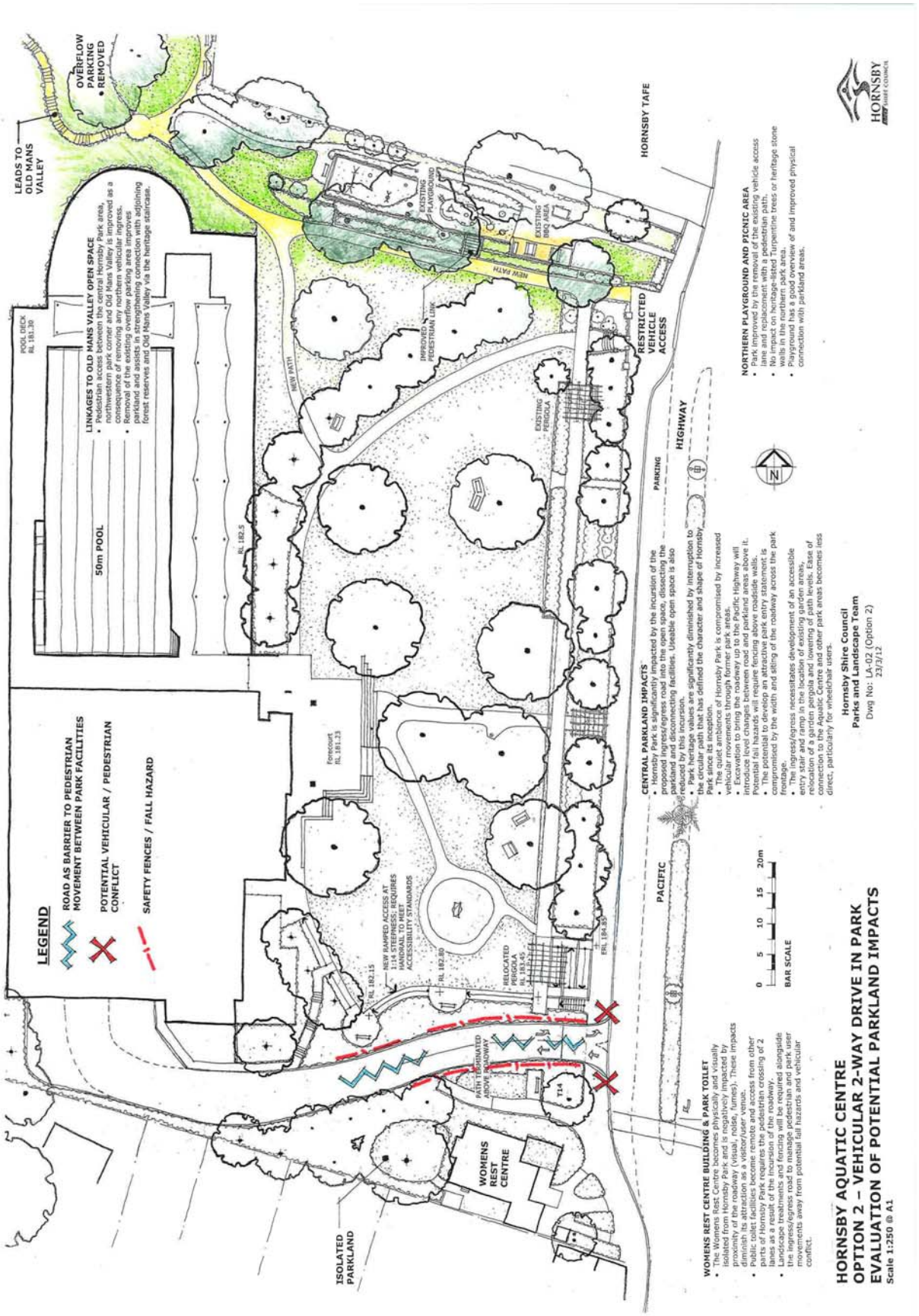


Fig. 5 Option 2, elaborated by Council

Fig. 6 An extract from the Scrivener landscape master plan for the Aquatic Centre, showing that the key landscape elements would all be protected if the Women's Rest Centre were removed.

Demolition of the Women's Rest Centre would enable the entry into the park to be aligned with the traffic lights at Coronation Street, and also for none of the important landscape elements in the park to be adversely affected – other than the removal of the old Magnolia tree. Scrivener's landscape design reflected this, with only minor changes being made to the alignment of the southern arm of the 'D' pathway (marked 'L' on the plan.). The revised Hornsby Council landscape plan (Figure 4) also indicates an expanded paved courtyard area adjacent to the retained toilet block, where the Women's Rest Centre can be commemorated. This change also has the effect of removing the circular paving pattern, due to space constraints (shown as 'U' in Figure 5).

Disadvantages of retaining the Women's Rest Centre

There are numerous disadvantages in doing this. It necessitates distorting the traffic light locations and settings for the Coronation St – Pacific Highway intersection. It would also oblige the movement further northward, into the park of an access roadway, as shown in Option 2 in Figure 3 above.

Option 2 was developed mainly in order to avoid the demolition of the Women's Rest Centre. However, the proposed access road would

- isolate that building by placing an active vehicular roadway between it and the park;
- reduce the available open space in the southern-central area of the park;
- necessitate the demolition and relocation of the southern pergola;

- cut across three historic pedestrian pathways, including the principal one on the north-south axis and the southern D shaped pathway – all identified as important, original, contributory items in the heritage reports;
- lose the opportunity to reinforce the southern D shaped pathway with a complementary avenue of Jacaranda trees adjacent to the southern side of the circular pathway;
- necessitate the removal of the bus shelter along the Pacific Highway boundary; and also
- the removal of part of the southern section of the garden bed that fronts the street and a mature Angophora tree (Tree 13).

Even more unsatisfactory, vehicular entry to it would have to be on a left-in, left-out basis, as no right-hand turn would be available, and could not benefit from the traffic light controls as Option 1 could. These impacts are demonstrated by the more developed landscape plan for Option 2, prepared by Hornsby Council, which highlights that Option 2 is amongst the worst solutions with respect to its impact on the heritage qualities of the southern parkland (see Figure 7). Other consultants have identified a range of other practical issues arising from this option.

Option 8 – shown below – was developed by a local architect, Mark Cambourn, in an attempt to demonstrate that the Women's Rest Centre could be retained if a one way loop road were developed.

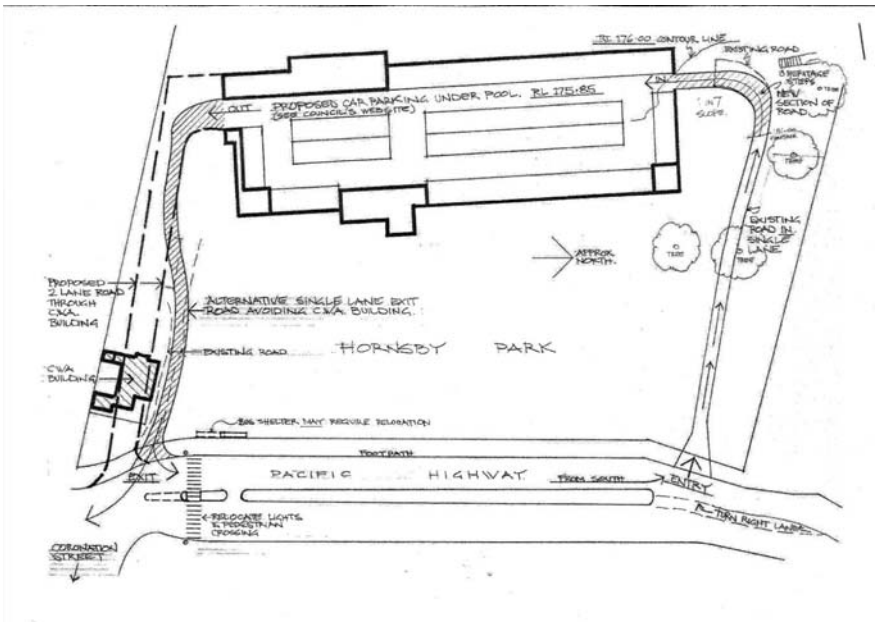


Fig. 7 As access and entry in the loop road can be achieved at either end, it is known as Options 8 & 9.

Options 8, 9 and 12, like option 2, would also have adverse impacts on the existing heritage pergola as well as planned park landscape improvements identified in the Development Application plans. These impacts include the deletion of the planned circular, distribution, entry node in the S-E sector (shown as item 'U' in Figure 6 above), and make it necessary to replace the circular element with an alternative arrangement of stairs and ramp. It would also, most undesirably, cut across the historic pathway system and require their realignment. Options 8, 9 and 12 require the relocation of the heritage-valued southern pergola a few metres northward, thus distorting the symmetry of the original layout. These options would also require the removal of the old Magnolia tree, the old bus shelter, an Angophora tree, and part of the southern end of the garden bed; as demonstrated by the more developed landscape plans prepared by Hornsby Council for Options 8 & 8b on the following pages.

Limiting access to the northern sector

Limiting vehicular access to the new Aquatic Centre via the northern end of the park, as proposed in Options 3, 4, 10 and 11 would save the Women's Rest Centre but create other adverse heritage impacts, the principal of which would be the removal of at least one, and in options 10 and 11, several mature Turpentine trees on or near the northern side boundary. All of these are agreed to have heritage significance. Option 3 would require the excavation of a long trench down to a depth of about 4 metres along the alignment of the existing service road, and widening it. Investigations of opportunities to bridge a portion of this roadway adjacent to the Aquatic Centre - and grassed over (in a similar way that the Domain at Woolloomooloo was linked to the Art Gallery), demonstrate that it would also separate the children's playground and the BBQ area from the rest of the park with unattractive fencing, and lead to a closing off of the heritage staircase, and present and future walking tracks, down into Old Man's Valley from the far north-west corner of the Park.

Moreover, the increase in traffic that has been predicted would mean that access would be restricted as a consequence of the new road forming a physical barrier between the open parkland and the playground. Users of both the playground and the small BBQ area, would be forced to enter from the east, near the main footpath along the Highway.

There is a rough verisimilitude between Options 8 and 9 to the original concept of the access driveway to the edge of the escarpment to enjoy the view down to Old Man's Valley, which gives it some attraction. However, the existing driveway pavements would have to be widened and level changes made, and there would be traffic entry and exit complications at both points where they join the Pacific Highway. As demonstrated in Option 8, investigations undertaken by Hornsby Council, indicate there would need to be changes to the alignment of the southern D-shaped pathway. More significant however are the impacts of vehicles utilising the northern entry road (Option 8). Vehicles will commence ramping down steeply well before reaching the aquatic centre and this would have a significant adverse impact on the park by permanently isolating and separating the central park areas from the northern playground and restricting linkages to Old Mans Valley.

Council has investigated alternative arrangements for this accessway (Option 8b) and found that by altering the alignment of this road into a curved form in the aquatic centre area, that the steeply ramped cutting can be confined to the aquatic centre building zone. This approach is superior to Option 8 as it enables a pedestrian crossing from the central parkland linking it to Old Mans Valley and facilitates the development of parkland to replace the existing informal gravel carpark. However Option 8b still has negative impacts on the playground area associated with the imposition of a relatively busy road through this portion of the park and the need to close off the existing stair connection to the children's playground. As noted by the arborist, both Options 8 and 8b have a high potential for major adverse impacts on the heritage Turpentine trees (Option 8 tree numbers 44 and 52; Option 8b tree numbers 44, 52 and 60). Other trees are expected to be adversely impacted however these are not likely to be major, if Council proceeds to construct a relatively expensive Bailey's Bridge solution as recommended.

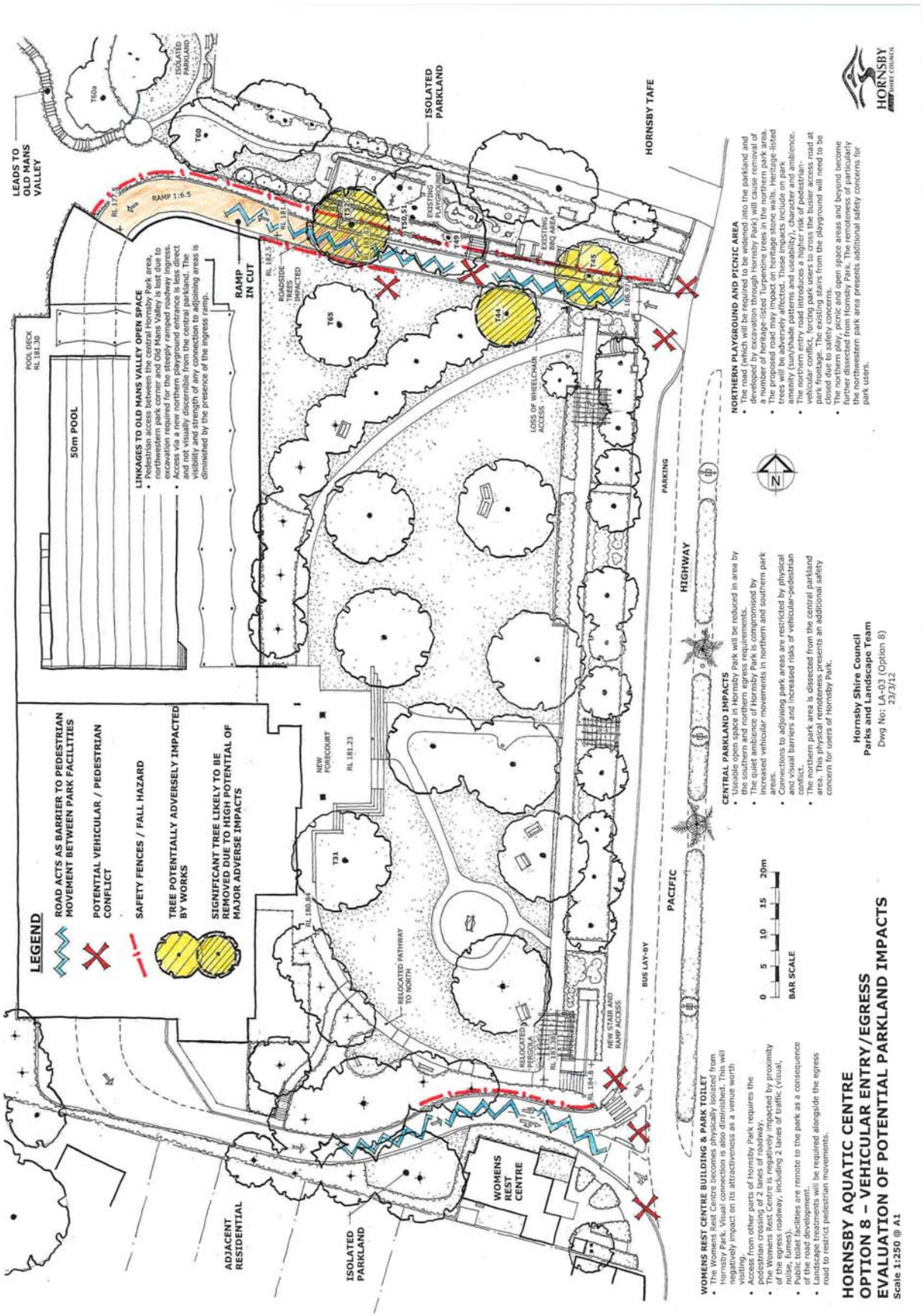


Fig. 8 Option 8, elaborated by Council

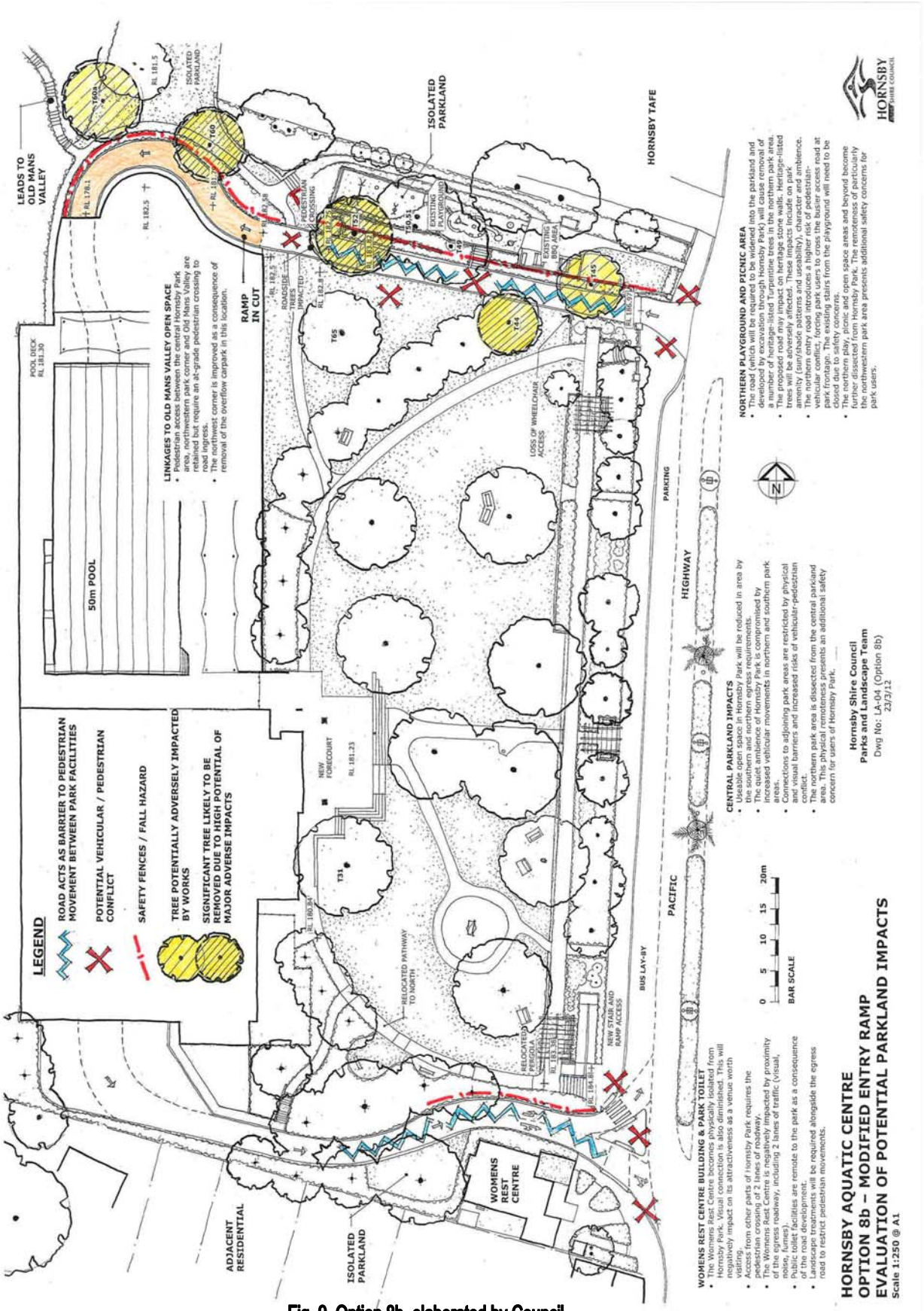


Fig. 9 Option 8b, elaborated by Council

Options 10 and 11 are unsatisfactory because too many heritage-listed turpentine trees and a dry stone wall would need to be removed, and both the children's playground and BBQ table and shelter would have to be removed or relocated elsewhere in the park. Moreover, as the land level is higher along the northern boundary, it would be more difficult to get down to the desired level of the base of the car park. **Option 4** – on land owned by TAFE, not Council - would suffer from similar problems.

Option 7 is seen as visually intrusive and its hairpin bends somewhat hazardous.

Option 12 is a compromise between options 2, 8 and 9.

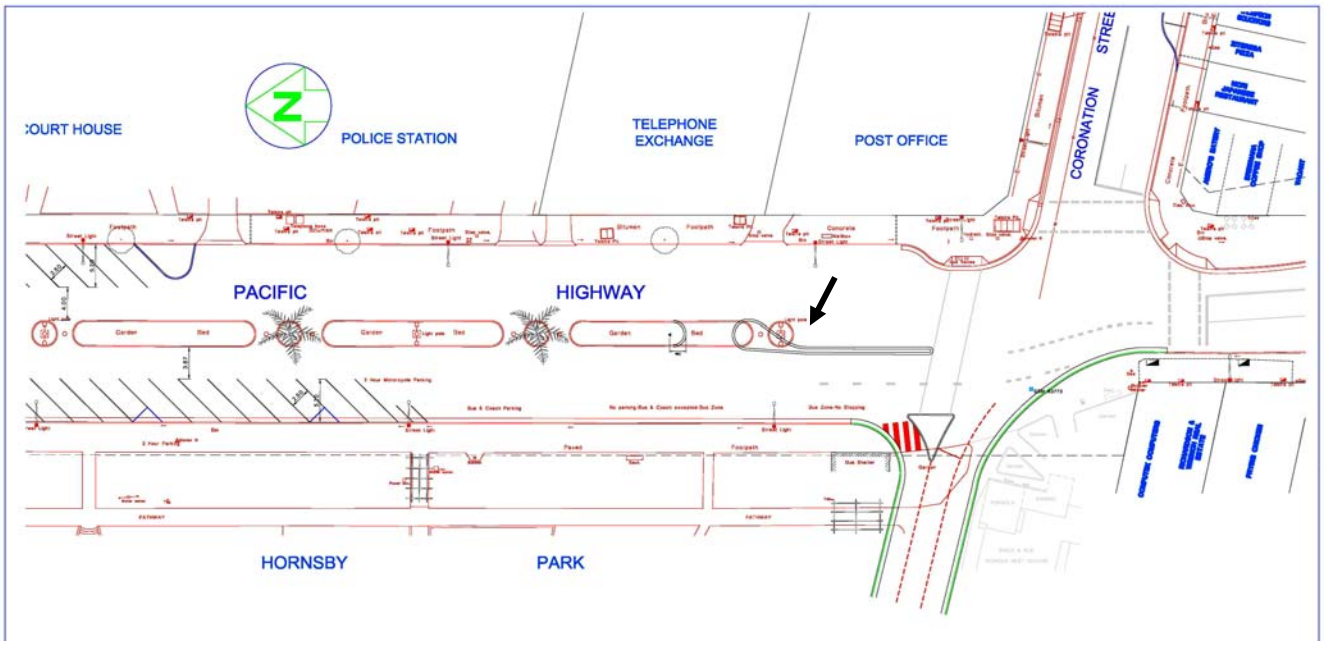


Fig. 10 Option 12, as prepared by Hornsby Council. Some refinement of this design is intended.

We note that the landscape architect, Scrivener, considers this option "would require the compacting of competing pedestrian access, vehicular access, disabled path access and retention of important heritage items into too small an area to make it a viable alternative. The likely result is the demolition of the above mentioned items of significance to the fabric of the park, including the path alignments, the bus shelter, and the linear garden alignment along the S-E street frontage." An attempt to provide a right hand turn into the park from just north of the Coronation Street junction (arrowed on Fig.10 above) could also necessitate the truncation of the central traffic island, and removal or relocation of its heritage street lamp. As both of these are regarded as important heritage elements of the composition of civic complex and park, such an action is considered most undesirable. An alternative intersection design involving the removal of the traffic island 'blister' on the eastern side of the highway, adjacent to the Post Office would appear to enable the central traffic island to be extended and the achievement of a more attractive outcome.

Option 13.

This has been submitted recently by a local resident, who wrote:

We should treat the park with more respect.

Keep CWA, add sympathetic cafe in same 1950's style behind, move current playground to south, build decent loo block, keep access and parking at right. Fix up bus stop area for long-distance buses too. Make road to north of CWA building a wide pram/walking path instead, (which park utes can also use if needed). Pave all

paths with something sympathetic to the park and pool - get rid of all bitumen and no westfield pink/grey slippery stuff.

Fig. 11 Option 13, as submitted by a local resident, with notations inserted over an aerial image.

This option seeks to retain the 1958 CWA Women's Rest Centre, and transferring the children's play area to the southern edge of the park. It adds a café, and proposes that the toilet block be moved further west, downslope. It would thus enable all the facilities to be clustered together in an area of the park that is presently little used. (One might ask whether a café is really needed, with others in the shopping centre being so close.)

While this option would allow the southern heritage elements, including the southern 'arm' of the 'D' pathways to be retained, it would completely remove all the heritage Turpentine trees from along the northern boundary, exposing the park directly to the TAFE buildings. It would also necessitate the relocation of the children's playground (as mentioned), the removal of the Rotary-donated BBQ area, the northern arm of the original entry wall (rated as of 'high' significance), and the dry-stone walling (of 'medium' significance) down the present access driveway to the rear parking lot. Apart from the endemic Turpentine trees – regarded as of high heritage significance, some of these are elements which have been present in the park since the late 1930s, and together contribute to the character of the park.

It is uncertain whether provision was made in this plan for parking for 50 cars at the north-west corner of the site to obviate the necessity to provide parking below the Aquatic Centre. If so, while this may avoid having to dig a long 'trench' down the existing northern service road to reach the underground parking below the pool, as in Option 8, it would require a redrafting of the plans for that Centre. It would also turn a potentially very attractive north-west corner of the park, as per Options 1 and 2, into

a bare parking lot, and rule out proposed adventure (Wow!) facilities at the northern end of the Aquatic Centre. The existing character of the north-west corner is very poor visually now; turning it into a bigger, bare parking lot would only make it worse.

To summarise, from a heritage perspective:

- Only option 5 offers no adverse heritage impacts on the park, but other problems rule it out.
- Option 6 also offers no adverse heritage impacts on the park, but as the site is itself a heritage-listed place (with no connection to the park), that also rules it out.
- Option 1 offers a few, but minor impacts on the park's landscape heritage, but involves the removal of the Women's Rest Centre, which has only recently been heritage listed and is not considered as significant from a heritage perspective as key elements of the park.
- Options 8 and 9 have some possibilities, but will have negative impacts on the park, especially through the isolation of the playground / BBQ area and access to parkland to the west. Some Turpentine trees will also have major adverse impacts. The Option 8b plan prepared by Council demonstrates how some of these foreseen problems may be addressed, however it is still considered a significantly worse outcome for the park than Option 1.
- Option 3 has undesirable impacts on existing significant trees, imposes a disturbing and unattractive ramp structure on this portion of the park and isolates the children's playground further from the park through the removal of the access staircase and addition of safety fencing along the ramp edges.
- Options 2, 4, 7, 10 and 11 would all have considerable adverse impacts on the landscape heritage elements and values of the park. Option 2 is considered amongst the worst in terms of impact on the heritage fabric of the southern end of the park.
- Option 12 may, with some fine tuning, be made to overcome some of the foreseen adverse impacts on the landscape heritage fabric, but is definitely less desirable than option 1 as it results in loss of valuable parkland and isolation of the Women's Rest Centre from the rest of the park.
- Option 13 would remove all the heritage elements down the northern end of the park, making it a bare, two-way roadway. Removing all the existing trees would also destroy the present sense of enclosure, softening and visual screening which they presently provide of the adjoining TAFE building. In my opinion, those impacts would be most undesirable.